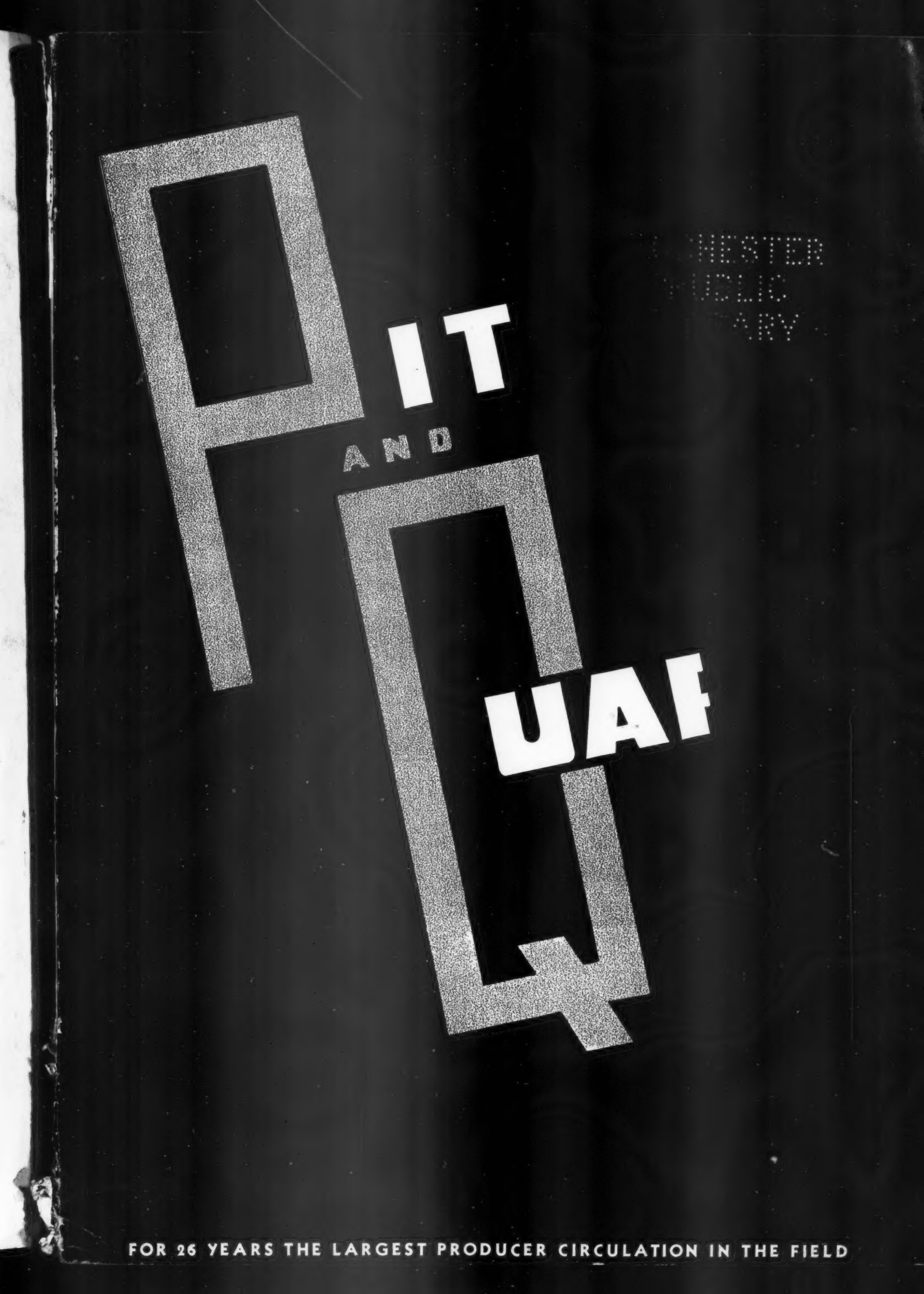
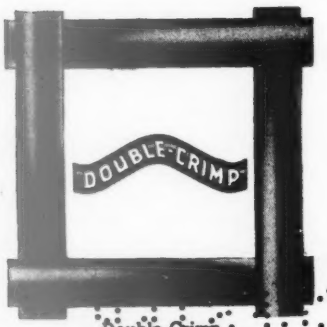


NEWCHESTER
PUBLIC
LIBRARY

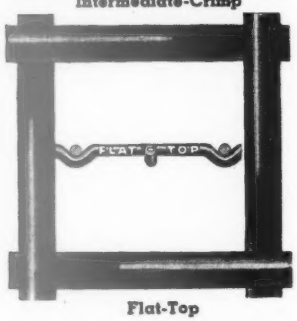
FOR 26 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD



Double-Crimp

Arch-Crimp

Intermediate-Crimp



Flat-Top

"The Perfect"

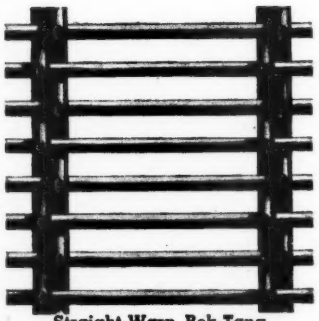
Wire Cloths and Screens

of

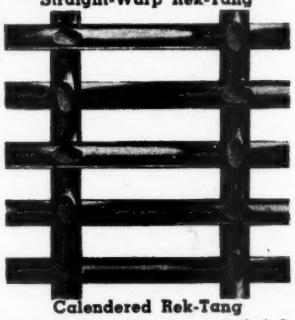
SUPER-LOY
STEEL
GALVANIZED STEEL
STAINLESS STEEL
NICKEL-CHROME STEEL
PHOSPHOR BRONZE
BRASS
COPPER
MONEL
NICKEL
ALUMINUM

•

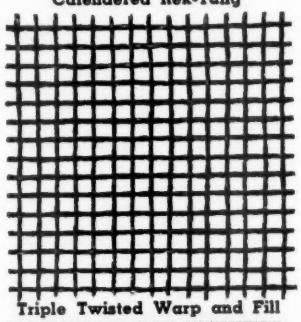
Any Special Metal for Any Service



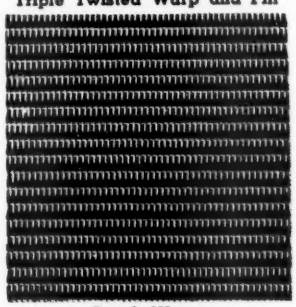
Straight-Warp Rek-Tang



Calendered Rek-Tang



Triple Twisted Warp and Fill



Dutch Weave

"Perfect" WEAVES

Arch-Crimp
Coiled
Double-Crimp
Double-Fill
Dutch
Flat-Top
Herringbone
Intermediate-Crimp
Rek-Tang
Selvage-Edge
Straight-Warp
Stranded
Sta-Tru
Triple-Warp
Twilled
Twisted-Fill
Twisted-Warp

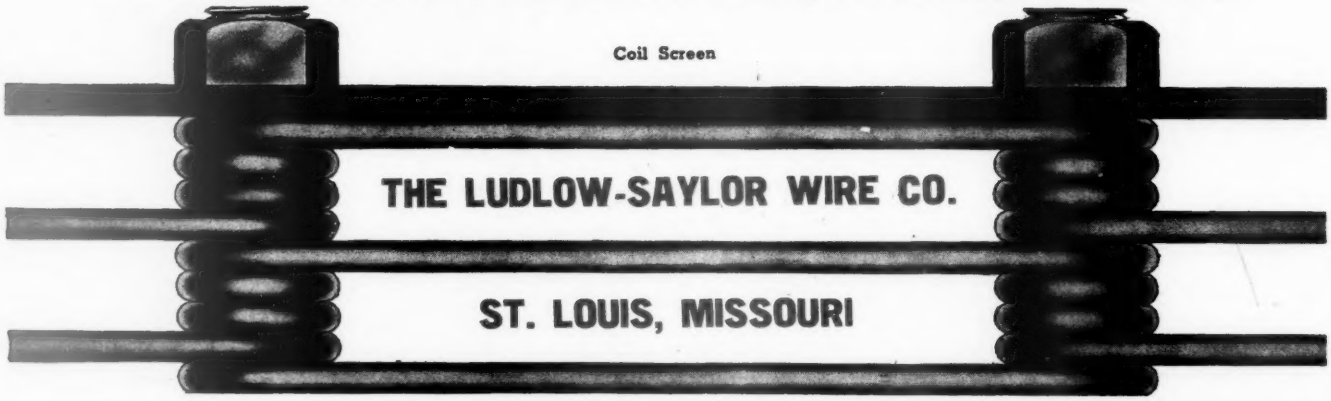
"Perfect" PROCESSING

Arc-Welding
Bending
Binding
Brazing
Calendering
Coiling
Crimping
Cutting
Dipping
Dishing
Finishing
Flanging
Flattening
Forming
Framing
Galvanizing
Jointing
Knuckling
Painting
Rolling
Selvaging
Shaping
Shearing
Slitting
Soldering
Spot-Welding
Squaring
Stitching
Tack Welding
Trimming

"Perfect" PRODUCTS

Baskets
Circles
Coils
Cones
Cylinders
Discs
Forms
Leaves
Lengths
Panels
Pieces
Ribbons
Rings
Rolls
Sections
Segments
Strips
Templates

Illustrations show items listed in bold-face type.
Other wire cloths and screens will be illustrated in subsequent advertisements of this series.



Coil Screen

THE LUDLOW-SAYLOR WIRE CO.

ST. LOUIS, MISSOURI

Rochester Public Library
NOV 23 1943
ROCHESTER, N.Y.

30 TON PAYLOAD

...and built to carry it!

IRON ORE . . . that happens to be the critical payload in this case. We are proud to be playing our part in this important work.

Born of nothing more than rough sketches and verbal expressions, these bodies represent the ideas of a practical operating man and EASTON'S conception of how to accomplish his job. What EASTON has done for others can also be done for you.

EASTON has been a specialist in tailor-made trailers, dump trucks, mine cars, and electric lift trucks for years. If you're confronted with a materials handling problem, there's a good chance we can help you. Write to: Engineering Counsel, Easton Car & Construction Company, Easton, Pa.

B-1008

EASTON

INDUSTRIAL CARS
TRUCK BODIES · TRAILERS
ELECTRIC LIFT TRUCKS

PIT AND QUARRY, November, 1943, Vol. 36, No. 5. Published monthly by the Complete Service Publishing Company, 538 South Clark Street, Chicago 5, Ill. Subscription price $2 for 1 year in the U. S. and possessions, Canada, Central and South America; elsewhere $1 additional for each year. Single copies 50 cents. Entered as second-class matter February 28, 1932, at the Post Office at Chicago, Ill., under the Act of March 3,1897.

20% to 40% lighter... *type for type*

Permits use of larger volume bucket on your machine . . . . regardless of <u>normal</u> capacity!

Here's the bucket every excavating contractor and dragline operator has dreamed of and wished for. A bucket that's light yet strong, unsurpassed for wet or dry digging, easy to handle, and with inbuilt durability to give years of trouble-free service. Light enough, even in the larger sizes, to maintain allowable loaded weight when used on small machines or on long boom.

If you want to speed up your operations under all digging conditions . . . move *more* material *faster* . . . you need Hendrix Lightweight Buckets for your draglines. Write today for descriptive literature, specifications and prices or *ask your dealer*.

1. **ALL WELDED CONSTRUCTION . . . *no rivets***
2. **10% to 14% MANGANESE STEEL CHAINS and FITTINGS**
3. **20% to 40% LIGHTER THAN OTHER BUCKETS, *type for type***
4. **GETS FULL LOAD OF PAY MATERIAL EVERY TRIP *even in wet digging***
5. **PERFECT BALANCE *for ease of handling***

HENDRIX *Lightweight* **DRAGLINE BUCKETS**

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

4-Time Vote for Lorains ...

FROM CARBON LIMESTONE CO.

WHEN *all* the cards are on the table, there is only one answer to the question, "What is the best shovel for rock service?"

That answer spells L-O-R-A-I-N. It's there in the heavy, powerful design and the host of time and maintenance-saving features. It's there in the performance records of hundreds of quarry operators from coast to coast.

And it's there in the number of repeat orders from successful companies like Carbon Limestone, purchasers of 4 Lorains. People who know the qualifications of a real rock shovel say,

"Lorains move more material, faster, at lower cost".

THE THEW SHOVEL COMPANY
LORAIN, OHIO

thew-Lorain SHOVELS

CRANES • DRAGLINES • MOTO-CRANES

Superior POWER for the generators of industry

IN all parts of the world Superior Diesel are driving generators that supply power for hundreds of vital jobs.

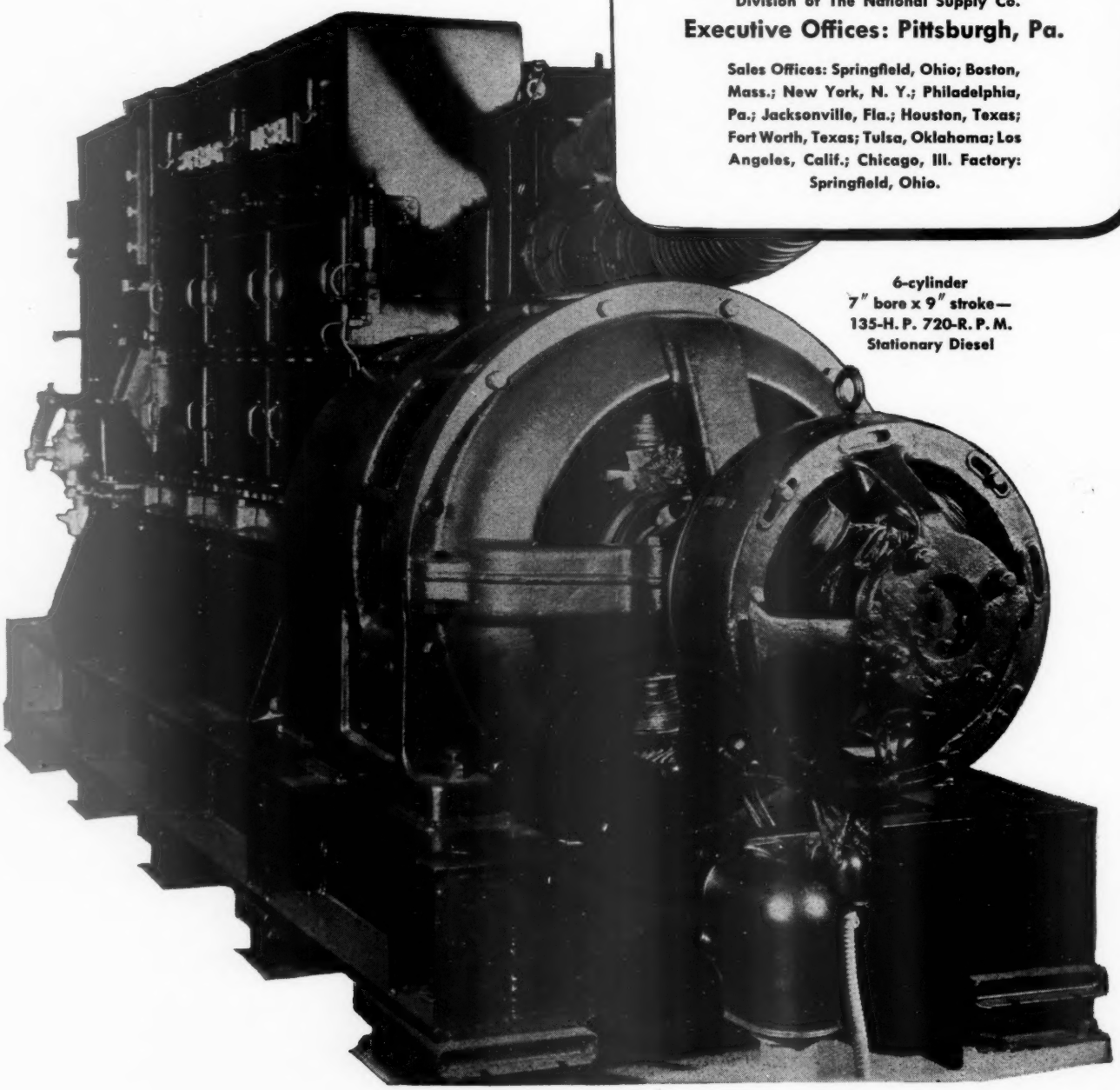
Now more than at any time in Diesel history, the dependability of Superior Diesel Engines is paying the highest dividends in service rendered.

SUPERIOR ENGINES

Division of The National Supply Co.

Executive Offices: Pittsburgh, Pa.

Sales Offices: Springfield, Ohio; Boston, Mass.; New York, N. Y.; Philadelphia, Pa.; Jacksonville, Fla.; Houston, Texas; Fort Worth, Texas; Tulsa, Oklahoma; Los Angeles, Calif.; Chicago, Ill. Factory: Springfield, Ohio.



6-cylinder
7" bore x 9" stroke—
135-H. P. 720-R. P. M.
Stationary Diesel

Working and Saving Keep Them Waving

THREE TIMES WON FOR EXCELLENCE IN WAR PRODUCTION

Richard Kauzlaurich, husky machine operator, topped the winners in 14 other departments with a work record average of 10 hours and 48 minutes nightly since the first of the year. To him went the honor of hoisting the Navy E flag awarded for the third time to the employees and management of the Union Wire Rope Corporation. To him (and his 3 year old son, Richard, Jr.,) went the congratulations of Rear Admiral Alex M. Charlton, U.S.N., Inspector of Navy Material, Chicago.

In praising the company's production record, Rear Admiral Charlton said the wire rope it has made for the Navy in recent months would stretch from the Union Wire Rope plant to Guadalcanal, take a hitch around a palm tree and extend on to Australia.

Union Wire rope employees are pledged to save to keep the Treasury Minute Man burgee flying. The men and women of Union Wire Rope are also working day and night to produce wire rope so vital to winning the war.

• To Help All Industry . . . SAVE Wire Rope . . . Keep It WORKING . . .

Your wire rope still faces a tough assignment. It must continue to work overtime, often under overload, with chances of replacement limited. Why? Because modern warfare is dependent upon wire rope to hoist, handle, load and unload vast tonnages of war materiels.

5 BOOKLETS FREE!

To help you save wire rope and keep it working, we offer free for the asking, 5 booklets, entitled: **1. Splicing Wire Rope, 2. Socketing Wire Rope, 3. Correct Handling of Wire Rope, 4. Lubrication of Wire Rope.** These give you specialized information. **Rope Dope (5)** amplifies on abuses of wire rope and their remedies. All are written in non-technical terms. Put into practice, the information these booklets contain will stand you in good stead now and post-war.

UNION WIRE ROPE CORPORATION
2132 MANCHESTER AVE. KANSAS CITY 3, MO.

union Wire Rope corporation

Tokio

PUSHING highways across the wastes of the Aleutians or other out-of-the-way places puts both tractors and trucks on the spot, and demands tops in lubrication.

To get the kind of lubrication that means high efficiency and long life, contractors more and more are using *Texaco Ursa Oil X★★*.

Texaco Ursa Oil X★★ keeps engines clean, rings free. It holds deposit-forming materials in suspension so that they drain away at oil-change time. It protects alloy bearings, prevents scuffing of rings, pistons, cylinders.

For quieter-running, longer-lasting transmissions and differentials use *Texaco Universal Gear Oil.*

A Texaco Lubrication Engineer is freely at your service through more than 2300 Texaco distributing points in the 48 States. The Texas Company, 135 East 42nd Street, New York 17, N. Y.

THEY PREFER TEXACO

★ *More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.*

★ *More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.*

★ *More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.*

★ *More revenue airline miles in the U. S. are flown with Texaco than with any other brand.*

★ *More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.*

TEXACO

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT – CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

Trade
Lubricants and Fuels

Dear Mom:
I'm among old friends way over here ~ today a B-G plant + I helped assemble when Barber-Greene!

We have had to learn to walk and to save fuel and stop overeating. Prices are going up with taxes. We at home — among familiar scenes and faces—are having it "tough."

But Harry, our office boy, wrote of the thrill he got meeting a Barber-Greene Ditcher as he marched into Bizerte. He, and 126 other Barber-Greeners in Service write us with nostalgia of meeting Barber-Greene machines on foreign soil. To them, those pounding, unlovely masses of welded steel represent HOME. To them, in Africa, Sicily, the South Pacific, Alaska, Greenland, Iceland, those machines working in burning sands, coral atolls, or frozen tundra are the one familiar sight. Home!

Those in service inspire us—as they must all producers of war goods — to "E" production and "Star" production. As we get more and more of these reminders of home — American construction equipment,—out of the plants to the front, we will hasten that day when home is really home, and not just a memory inspired by a mass of steel at Bizerte, Berlin or Tokyo.

43-4

BARBER-GREENE

AURORA, ILL.

TRAYLOR Multi-Stage FINE REDUCTION CRUSHER

The Traylor-Stearns Multi-Stage Fine Reduction Crusher is incomparable for fine crushing for several reasons—(1), being, in effect, THREE machines in one, it SIZES the initial material (in the Upper Stage), FEEDS the Lower Stage with exactly the right quantity, evenly distributed, and FINISHES the reduction (in the Lower Stage) in unusual capacity; (2) the machine cannot choke at any setting because the crushing elements are the Traylor Original Patented Non-Chokable Bell Head and Curved Concaves, which save power; (3) simple devices render adjustment easily and rapidly; (4) it is automatically lubricated and effectively protected against destructive dust and grit, and breakage by tramp steel.

The Multi-Stage is built in a range of sizes that render it widely applicable where fine product is required in large capacity. For instance, the smallest machine (size 1'-8") may be operated at 1/8" setting (closed side) and can be adjusted upward to 3/8" setting (closed side). The largest Multi-Stage at present (4'-0") may be set as close as 5/16" (closed side) and can be adjusted upward to 3/4" (closed side). The in between sizes are 2'-4" (setting range 3/16"-1/2") and 3'-0" (setting range 1/4"-5/8").

WE BUILD

Rotary Kilns
Rotary Coolers
Rotary Dryers
Rotary Slakers
Scrubbers
Evaporators
Jaw Crushers
Gyratory Crushers
Reduction Crushers
Crushing Rolls
Grinding Mills
Ball Mills
Rod Mills
Tube Mills
Pug Mills
Wash Mills
Feeders
Rotary Screens
Elevators

GET BULLETIN 1113

TRAYLOR

ENGINEERING & MANUFACTURING CO.

MAIN OFFICE AND WORKS — ALLENTOWN, PENNA., U.S.A.

NEW YORK CITY 3416 Empire State Bldg. | CHICAGO 2051 One La Salle St. Bldg. | SALT LAKE CITY 101 West Second South St. | LOS ANGELES 919 Chester Williams Bldg. | SPOKANE S. 2707 Rhyolite Rd.

B. C. EQUIPMENT CO., LTD.
551 Howe St., Vancouver, B. C.

Export Department — 104 Pearl St., New York City. Foreign Sales Agencies: London, Lima, Rio de Janeiro, Buenos Aires, Santiago, Antofagasta, Oruro, Montevideo.

Help Wanted?

. . . to Help Lick

UNEXPECTED BREAKDOWNS?

How many of your key machines were built for 24-hour-day service?

. . . to Help Lick

LOW-GRADE DEPOSITS?

Has increased wartime demand brought new processing problems?

. . . to Help Lick

LAGGING SCHEDULES?

Maybe you have a bottle-neck—an added machine would load up all units.

WHATEVER HELP YOU WANT — CALL ON ALLIS

FRANKLY, MR. OPERATOR, we don't claim to know everything about your business. But the fact is that our Cooperative Engineering Service is helping hard-pressed operators like yourself straighten out a lot of tough kinks.

There's a reason for this: Because Allis-Chalmers builds *all types* of basic processing equipment... our engineers are *complete line* engineers—trained to look at your problem from the standpoint of *every* machine in your production cycle.

It's their job to know ways to help you make *existing* equipment work together more efficiently ...give you better "machine teamwork."

And if you need equipment, A-C engineers don't

Only Allis-Chalmers Makes a Complete Line of this Equipment!

Jaw Crushers	Gyratory Crushers	Crushing Rolls	Pulverators
All-steel primary and fine reduction. 1/4"-12" product.	High-speed primary and secondary. 3" to 60" size feed.	6 different types. Reduction ratios from 5-1 to 10-1.	"Multi-impact" reduces non-abrasives to cubical shape.

YOU CAN LEAN ON ALLIS-CHALMERS COOPERATIVE ENGINEERING — *HARD* — TO HELP BEAT PRODUCTION PROBLEMS FACING EVERY PROCESSOR TODAY!

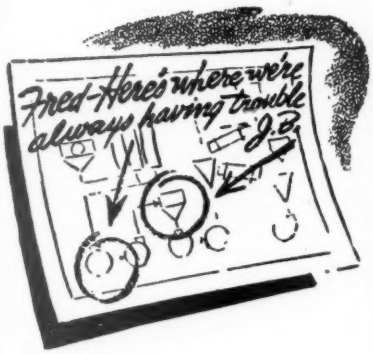
. . . to Help Lick

LABOR SHORTAGE?

Do you use any men unnecessarily? Crushing is a *machine* industry!

. . . to Help Lick

OBSOLETE MACHINERY?



Some machines that used to "get by" need too much maintenance today.

. . . to Help Lick

OVERWORKED ENGINEERS?

Outside engineering cooperation might solve many problems quickly.

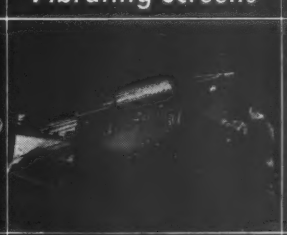
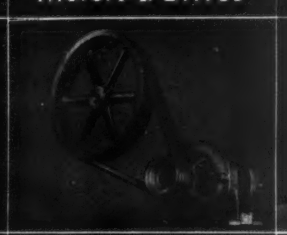
-CHALMERS!

have to "push" *one* type. *What you need* dictates their recommendation . . . *not what they've got!*

For the whole story of how Allis-Chalmers Cooperative Engineering (yours at absolutely no cost) can "team-up" with your own engineers to give you greater production, call your nearby district office. Or write ALLIS-CHALMERS, MILWAUKEE 1, WIS.

Models of processing machinery in A-C laboratories reproduce conditions in your plant — help eliminate guesswork!

A 1624-A

Blade Mills	Vibrating Screens	Log & Sand Washers	Motors & Drives	Centrifugal Pumps
				
For washing and disintegration of materials up to 12".	Efficient separation and dewatering — 8 different types.	All-welded modern units for materials up to 3½" size.	Unbeatable team—Lo-Maintenance Motor & Texrope V-belts	Largest line, highest efficiencies — built with motors

A big 10-ton, Diesel-powered Mack in grim war paint rushes supplies to the front. Sketched from photos, by Peter Helck.

©1943 MACK MFG. CORP.

WAR REPORT...WITH A PEACETIME TWIST!...

For your future reference, we'd like to put two facts on the record now. *Fact One*—there are *more* Mack Diesels in the United Nations' armies than any other make of heavy-duty Diesel truck. *Fact Two*—the only 10-ton Diesel trucks used by United Nations' armies which are made and powered by one manufacturer are Macks. This may surprise you . . . and it may mean a lot some day when *you* are deciding what Diesel to buy.

Mack Trucks, Inc., Empire State Building, New York, N. Y. Factories at Allentown, Pa.; Plainfield, N. J.; New Brunswick, N. J. Factory branches and dealers in all principal cities for service and parts.

Mack

TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

BUY U. S. WAR BONDS

IF YOU'VE GOT A MACK, YOU'RE LUCKY...IF YOU PLAN TO GET ONE, YOU'RE WISE!

Production rolls on a film of oil . . .

IN every major production step that leads to finished instruments of war—from the mine to the assembly line—oil plays a vital part.

Lubricating oils and greases keep the wheels and gears of war plants turning—protect production.

Cutting oils make possible the fast, accurate manufacture of the countless metal parts for planes, tanks, guns and ships.

Quenching oils harden and strengthen steel parts for the machines that make the weapons of war—as well as the weapons themselves.

Oil is veritably the lifeblood of modern mechanized warfare—on both the production front and the fighting front.

To assist you in getting all the benefits of modern petroleum science and manufacture, Gulf offers the helpful cooperation of its trained staff of Lubrication Service Engineers. With a background of thorough training and practical experience with all types of industrial equipment and processes, Gulf Service Engineers can help you get greater production, longer tool life, improved heat treating practice, fewer delays caused by mechanical troubles, and lower costs for maintenance and repairs.

GULF INDUSTRIAL LUBRICATION

Call in a Gulf Service Engineer to help step up production

GULF OIL CORPORATION—GULF REFINING COMPANY, PITTSBURGH, PENNA.

HAZARD LAY·SET

Preformed REWARDS YOU BY—

One of these invariably justifies its specification

1. LASTING LONGER
2. BEING SAFER TO HANDLE
3. SPOOLING BETTER
4. BEING FASTER TO INSTALL
5. REFUSING TO "PORCUPINE"
6. MAKING LANG-LAY MORE SERVICEABLE
7. BEING FREE OF TENDENCIES TO KINK
8. REQUIRING NO SEIZING WHEN CUT
9. RESISTING BENDING FATIGUE LONGER
10. GIVING YOU GREATER DOLLAR VALUE

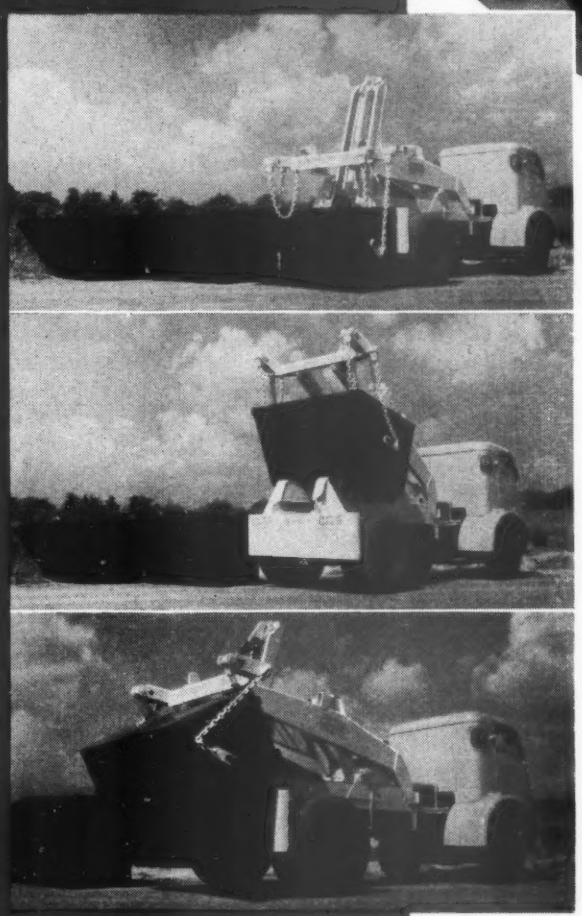
Look closely at this discarded Hazard LAY-SET Preformed wire rope. See any protruding wires?... No—not one of those broken crown wires leaves its assigned place. They remain flat and in place *because they are preformed.* • This means safer, faster, surer handling by workmen. No vicious barbs that may cause blood-poisoning and compensation claims. Hazard LAY-SET Preformed instills confidence in your men; fewer time-out accidents; steadier production. • It also means longer rope service and fewer needless damages to your equipment. Specify Hazard LAY-SET Preformed for your next rope. It gives you greater dollar value.

HAZARD WIRE ROPE DIVISION, Wilkes-Barre, Pa., Atlanta, Chicago, Denver, Fort Worth, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Portland, Tacoma
AMERICAN CHAIN & CABLE COMPANY, INC. • BRIDGEPORT • CONNECTICUT

GREEN SIGNIFIES SAFETY

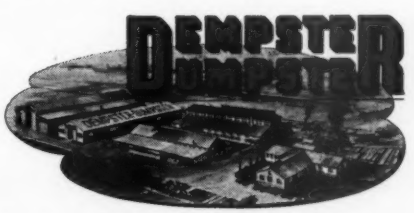
HAZARD LAY·SET WIRE ROPE

Lifting 6 TONS is duck soup!



★ Another Dempster Development For Industrial Materials Handling

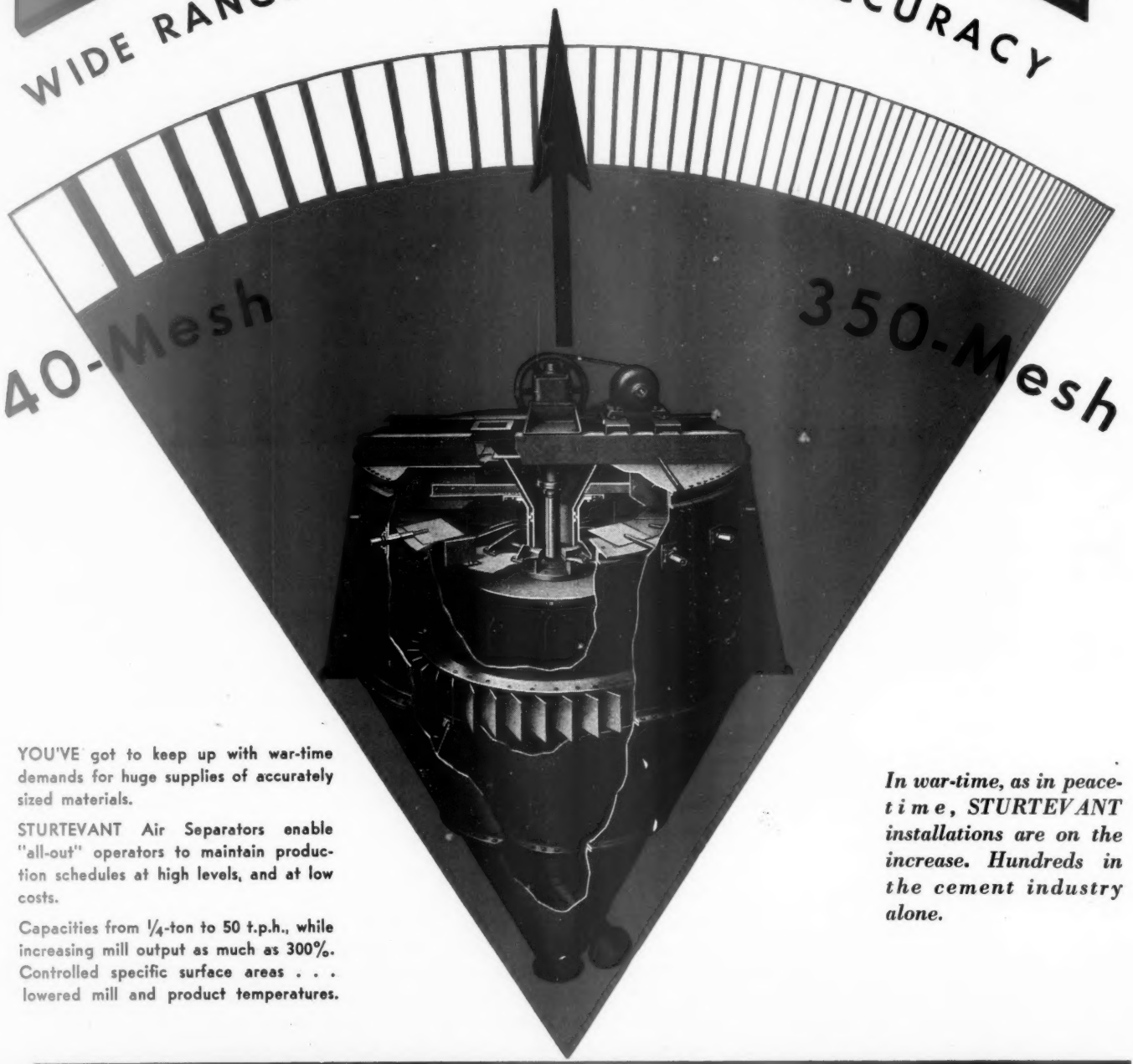
In hundreds of industrial operations throughout the nation, many of which are essential war plants, the Dempster-Dumpster is handling extremely heavy materials—hoisting, hauling, and dumping loads of almost unbelievable size and weight. Amazing as it may seem, a Model 500 LF Dempster-Dumpster truck unit will hoist any one of several types of Dempster-Dumpster bodies containing a pay load up to 7½ Tons with ease, place it in carrying position, haul it and discharge the load automatically, or set the load down intact, while other bodies, placed at convenient loading points, are being loaded. Other models of less capacity are available for lighter requirements for handling any type of materials . . . bulky, light or heavy . . . waste, unfabricated or finished product. It's simply a matter of adapting the Dempster-Dumpster to your needs . . . with one truck and any number of bodies of various types serving your requirements.



Dempster Brothers, Inc., 1113 Springdale, Knoxville, Tennessee

STURTEVANT

WIDE RANGE • *Fine Sizing* • ACCURACY



YOU'VE got to keep up with war-time demands for huge supplies of accurately sized materials.

STURTEVANT Air Separators enable "all-out" operators to maintain production schedules at high levels, and at low costs.

Capacities from 1/4-ton to 50 t.p.h., while increasing mill output as much as 300%. Controlled specific surface areas . . . lowered mill and product temperatures.

In war-time, as in peace-time, STURTEVANT installations are on the increase. Hundreds in the cement industry alone.

STURTEVANT MILL CO. BOSTON, MASS.

For Greater Production
on Long Haul Stripping Operations

...Plan to Use Tournapulls

The Tournapull, a powerful, rubber-tired driving unit, gives you speed on long-haul earthmoving, combined with all the job-proved operating advantages of the LeTourneau Carryall Scraper and Power Control Unit.

Tournapull two-wheel design concentrates weight on the drive wheels to give greatest possible tractive power for fast acceleration to top speed, for pulling through soft spots and up grades. Giant, low-pressure tires are easy rolling, provide greater gripping power and traction and maximum flotation, thus make operation possible in a wider range of working conditions than with conventional equipment.

Cable control, with LeTourneau Power Control Unit, permits top efficiency in all temperatures . . . is not affected by extreme heat or cold, or sudden changes in temperature.

Save Through Interchangeability

Carryall Scraper, Tournatrailer and Tournacrane are all interchangeable on the Tournapull . . . the only high-speed earthmoving unit which gives you scraper, crane and hauling service.

Tournatrailer is built for long hauling work where shovels are used. Tournacrane's ability to work in so many places, to quickly get from one part of a job to another, makes it ideal for loading, unloading and assembling heavy machinery; erecting poles; and laying pipe lines.

Tournapull-Carryall Scraper combination with its high speed, large capacity and one-man operation means that you can do more stripping work on long haul jobs with less equipment and fewer men.

See Your LeTourneau "Caterpillar" Dealer

Plan to use high-speed Tournapulls where you have long hauls on your stripping operations. Your LeTourneau-"Caterpillar" dealer can help you with this planning. See him NOW.

R.G. LeTOURNEAU INC

Peoria, Illinois — Stockton, California

Manufacturers of Dozers, Carryall* Scrapers, Power Control Units, Rooters*, Sheep's Foot Rollers, Tournapulls*, Tournarope*, Tournatrailers*, Tournaweld*, Tournacranes*. *Trade Mark Reg. U. S. Pat. Off.

Tournapull is designed for fast pusher loading . . . job-proved Carryall Scraper permits operation in rocky material, sand, clay, and common dirt. Rig travels 14 m.p.h. on the haul.

Large capacity, high-speed Tournatrailers are easy to maneuver . . . save time in backing up for loading and unloading. Complete rubber-tired unit allows travel on streets and highways.

The Tournatrailer's fast, end-ejection operation permits dumping over the edge of a fill or spreading in even layers at top speed.

Large copper mining company uses Tournacrane to unload and assemble heavy machinery, haul and spot steel in building construction, and hauling large boulders off of property.

NOT ON YOUR PAYROLL

but he's behind you all the time!

The IOWA DEALER

Cedarapids

Built by IOWA

THE IOWA LINE
of Material Handling Equipment Includes

ROCK AND GRAVEL CRUSHERS
BELT CONVEYORS — STEEL BINS
BUCKET ELEVATORS
VIBRATOR AND REVOLVING SCREENS
STRAIGHT LINE ROCK AND GRAVEL PLANTS
FEEDERS — TRAPS
PORTABLE PLACER MACHINES
PORTABLE POWER CONVEYORS
PORTABLE STONE PLANTS
PORTABLE GRAVEL PLANTS
REDUCTION CRUSHERS
BATCH TYPE ASPHALT PLANTS
TRAVELING (ROAD MIX) PLANTS
DRAG SCRAPER TANKS
WASHING PLANTS
TRACTOR-CRUSHER PLANTS
STEEL TRUCKS AND TRAILERS
KUBIT IMPACT BREAKERS

THERE is a man with the answers in your territory. He's a real part of the Iowa organization. He's your Iowa Cedarapids Dealer.

Dealer organizations with all the necessary ramifications for service don't just happen. Your dealer today has taken seriously his job of helping to keep the construction industry equipped. He has met the need with investment in machinery, and increased facilities for better service, and he has done this in the face of daily increased difficulties in securing the proper help.

Your dealer is a solid citizen with a real interest in his community. He is behind you with trained personnel that understands your problems both from the standpoint of your needs in planning and purchasing, and for maintenance.

He is ready with the right parts and assistance to keep your machinery on the job. He is your friend with advance information on future contracts. He can help you apply for a new machine for war essential work, and, if you can't secure new equipment, he'll strain heaven and earth to keep your old equipment running. Count on your Iowa Dealer.

IOWA MANUFACTURING CO., CEDAR RAPIDS, IOWA

NITRO-STARCH BASE

High Explosive Efficiency

IN MINING • QUARRYING • LOGGING AND CONSTRUCTION

PLUS 3 ADVANTAGES FOR YOU!

★ *WILL NOT PRODUCE HEADACHES FROM HANDLING OR FROM MUCK PILE FUMES*

★ *WILL NOT FREEZE OR LEAK . . . EFFICIENT AT ANY TEMPERATURE*

★ *WITHSTANDS GREATER IMPACT AGAINST ACCIDENTAL DISCHARGE*

EXPLOSIVES 1905 TROJAN 1943 CHEMICALS

ARMY E NAVY

Like all true Americans, we, of the Trojan Powder Company, detest war. We dislike to see our products used for purposes of destruction. But, as in World War I, we are grateful for the privilege of placing our resources at the disposal of our country, in the hope that they will play their part in speeding the day of peace, when Trojan High Explosives will again be used exclusively in constructive pursuits . . . to aid, as in years gone by, in the development of our Nation's resources.

TROJAN POWDER COMPANY

ONE OF AMERICA'S OLDEST HIGH EXPLOSIVES MANUFACTURERS

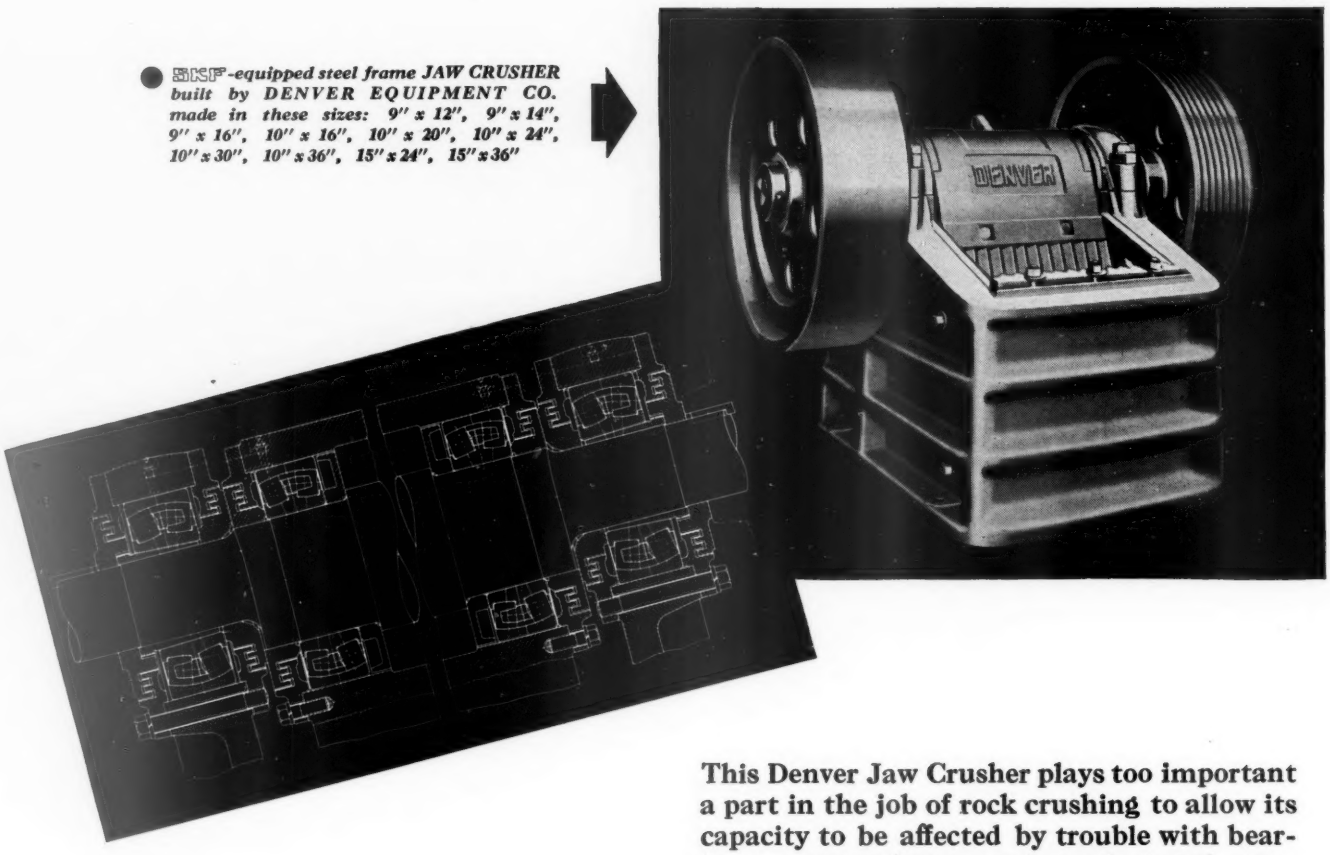
OFFICES: ALLENTOWN, PA. • SAN FRANCISCO, CAL. • LOS ANGELES, CAL. • PORTLAND, ORE. • NEW YORK, N. Y.

PLANTS: SEIPLE, PA. • ROBERT, CAL. • MAGAZINES STRATEGICALLY LOCATED THROUGHOUT THE NATION

MORE CAPACITY

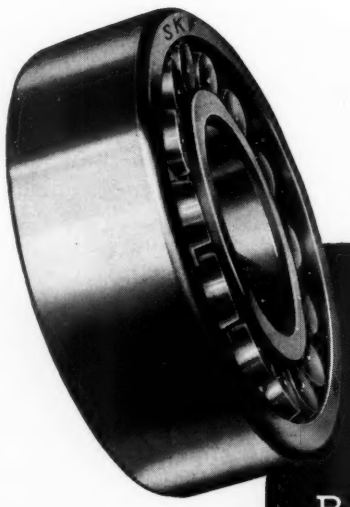
FOR THE DEMANDS OF WAR

● SKF-equipped steel frame JAW CRUSHER built by DENVER EQUIPMENT CO. made in these sizes: 9" x 12", 9" x 14", 9" x 16", 10" x 16", 10" x 20", 10" x 24", 10" x 30", 10" x 36", 15" x 24", 15" x 36"



This Denver Jaw Crusher plays too important a part in the job of rock crushing to allow its capacity to be affected by trouble with bearings—outstanding parts in producing the tonnages required for War needs. That's why SKF Spherical Roller Bearings were selected for eccentric and side locations—bearings which have load carrying capacity always available for useful work due to their built-in alignment. When a bearing's capacity for work is *high* so is the capacity of the machine of which it is a part. 5411

SKF INDUSTRIES, INC., PHILA., PA.



SKF

BALL AND ROLLER BEARINGS

Enlarged reproduction free on request

Thanks For Your Part

When certain pirates started picking off what they wanted in China, Africa, Europe and the Pacific—before coming at *us*—they figured that the U.S.A. couldn't do much about it. We didn't have enough ships to handle even 30% of our *peacetime* ocean traffic! How could *we* interfere!

But in twenty months, thanks to your help, America has broken all shipbuilding records. Fighting production workers in mines, mills, forests . . . in factories producing essential parts . . . in oil fields . . . and shipyards . . . have combined to accomplish the "impossible."

Continued success now depends on *maintaining* record-breaking production. The results are *beginning* to interfere with Adolph-Tojo plans. But America must not slacken its pace in producing the materials that go into the building and the operating of our Merchant Marine—the metals, timber, coal and oil, the marine equipment, and cargo for the ships.

Now it is up to all Americans to *finish* the job . . . and *fast.*

You Have Helped Us Do Our Part

We thank you, loyal customer, for conserving Wickwire Rope so that more can go to the Liberty Ships. But when you *need* new wire rope to maintain war production, tough, long-lived Wickwire Rope will always be available on priority, to the best of our ability.

• • •

Wickwire Spencer was first in New England to be awarded the Maritime M and Victory Fleet Flags for excellence in production of rigging for the U. S. Merchant Marine. A Gold Star has been added for maintaining that record.

Copyright 1943, Wickwire Spencer Steel Company, 500 Fifth Avenue, New York 18, N. Y.

WICKWIRE ROPE

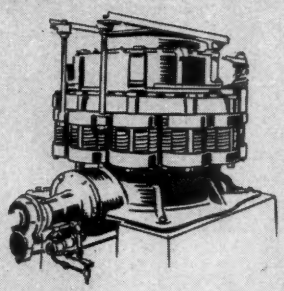
Sales Offices and Warehouses; Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles, Tulsa, Chattanooga, Houston, Abilene, Texas, Seattle. Export Sales Department: New York City

WISSCO PRODUCTS

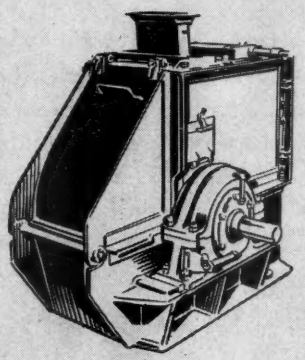
Used By Leading Producers

29 SYMONS CRUSHERS AND SCREENS INSTALLED BY ONE COMPANY

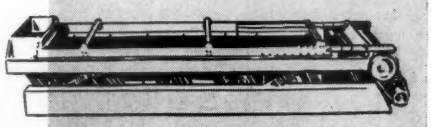
Two four-foot Cone Crushers at the Lockport, Illinois plant of Material Service Company.



CONE CRUSHERS



IMPACT CRUSHERS



SYMONS SCREENS

The frequent repeat orders received from many of the larger producers of crushed stone, gravel and slag are evidence of the satisfactory performance given by Symons Crushers and Screens. The Material Service Company, one of the nation's largest producers, is also an extensive user of Symons equipment. In this company's five plants located in northern Illinois, 29 Symons units are installed; 12 Cone Crushers; 3 Impact Crushers and 14 Screens. This progressive, fast growing company is another of the many prominent suppliers of crushed materials who continue to purchase Symons equipment for their expanded operations on the basis of satisfactory service given by previous installations.

When in need of reduction crushers or screens, profit by the experience of the leaders of the industry and make it "Symons."

NORDBERG MFG. CO.
MILWAUKEE 7, WISCONSIN

NEW YORK • LOS ANGELES • LONDON • TORONTO

NORDBERG MACHINERY

SYMONS CONE CRUSHERS

Belting and Hose with a Thumb

The thumb gives man his mastery over animals—his control of physical activity. The thumb symbolizes power and capability; strength put to work.

We say "Belting and hose with a thumb" because this statement best expresses the extra something that distinguishes Thermoid belting, hose and other industrial products. The engineers who design these products, and the production specialists who build them, have a realistic viewpoint that takes end-use problems into consideration. Beyond the belting and the hose, they see the tasks to be performed in the transmission of power and the movement of material.

This approach results in products that establish outstanding performance records . . . products that are born with the extra serviceability symbolized by the thumb. When "Thermoid" is on the products, everyone from the President down knows that the Purchasing Agent is buying the very best that can be had.

P.S. In line with material conservation, Thermoid has prepared a series of bulletins on how to extend the life of rubber products now in use. You might find them helpful to be passed on as reminders to your operating people. Feel free to ask for copies.

THE THERMOID LINE INCLUDES: Transmission Belting • F.H.P. and Multiple V-Belts and Drives • Conveyor Belting • Elevator Belting • Wrapped and Molded Hose • Sheet Packings • Industrial Brake Linings and Friction Products.

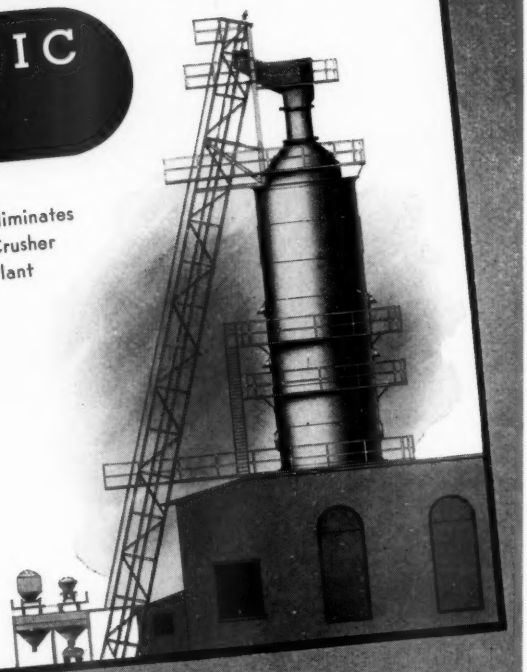
Thermoid Rubber
DIVISION OF THERMOID CO.
TRENTON, NEW JERSEY

IT'S GOOD BUSINESS TO DO BUSINESS WITH THERMOID

OPERATE for PROFIT WITH THE..

YORK-KUNTZ AUTOMATIC VERTICAL LIME KILN

Here's an automatic Lime Kiln that not only eliminates crushing, thereby cutting your overall investment, but also gives you continuous control . . . resulting in a uniform burn that reaches the absolute peak of lime-fuel efficiency known to the industry. What's more, with York-Kuntz you get this automatic operation in a plant taking up less ground space and needing the attendance of only one operator per shift. Provided for either mixed feed, gas or coal firing, York-Kuntz Vertical kilns are the answer to the operator who seeks to increase quality and saleability of his product as well as conserve precious manpower. Added mechanical York-Kuntz advantages are: Continuous Discharge . . . Continuous Feed . . . Adjustable Distribution . . . Center Load Support . . . Center Combustion Control. . . . Write for complete description today.



Eliminates Crusher Plant

AND THE..

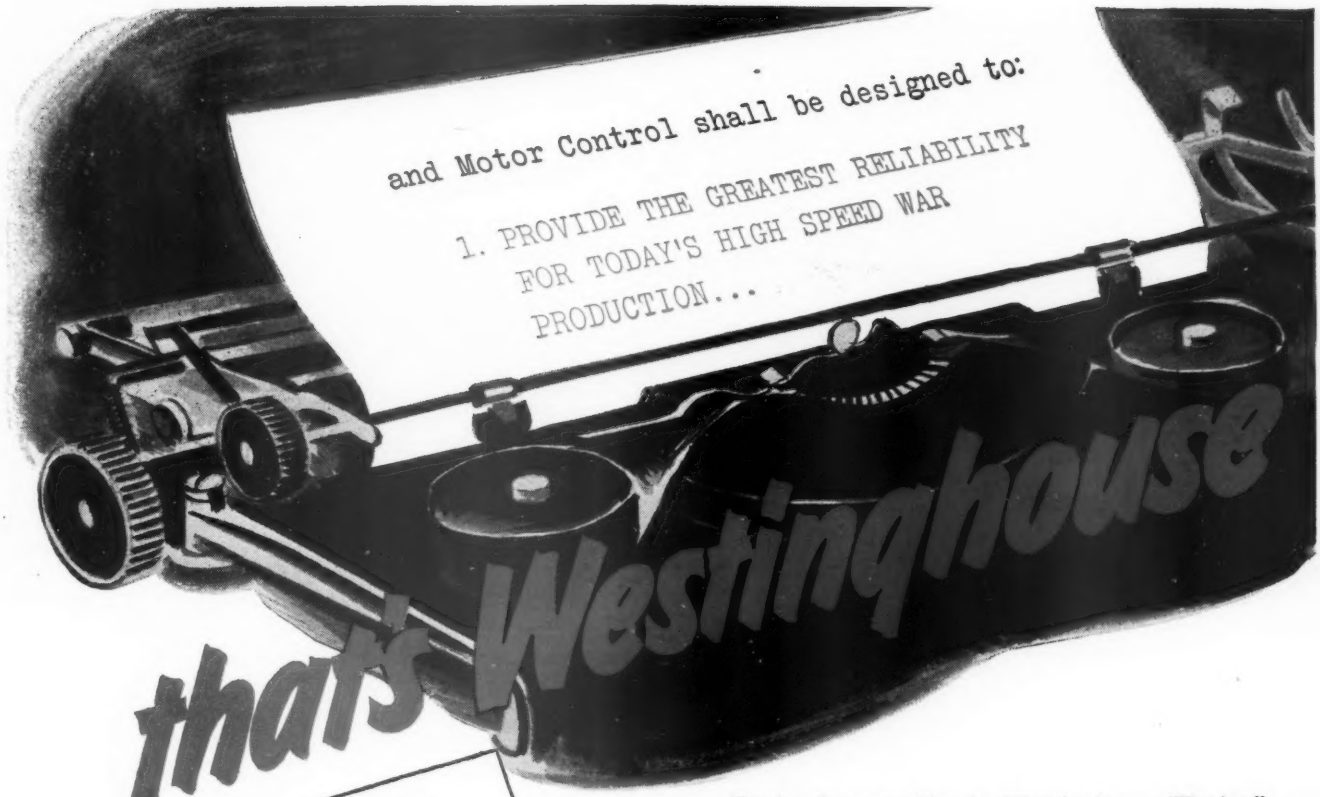
KUNTZ GRAVITY SYSTEM OF LIME HYDRATION

Absolute control of the hydration process within one unit . . . less floor space . . . lower first cost . . . that's operation for profit. You save as much as $1.50 per ton because patented dust control stops all loss of lime fines. You can meet more exacting market specifications . . . even in limes having as high as 10% impurities. Elements other than CaO or MgO are removed immediately by a patented dam and sump collection unit. Hydration heat, usually wasted, is used to heat water applied to the hydrator. These are a few exclusive Kuntz method features. Kuntz remains today the *only automatic system of one-man operation giving 100% control of quality and uniformity.* Batch or continuous method: can be applied to any type of hydrate plant. Write for complete information today.

Automatic Batch or Continuous Operation

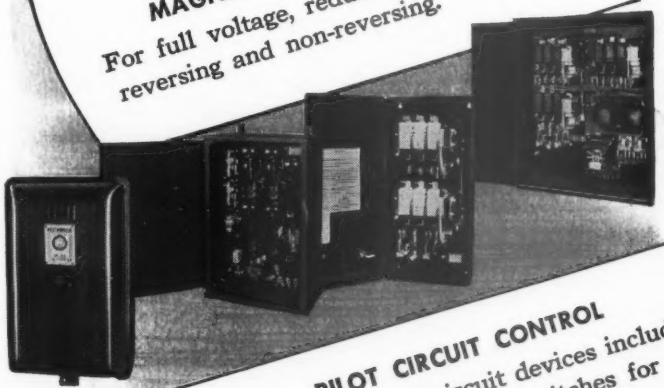
LIME & HYDRATE PLANTS CO.

Associate **McGANN MANUFACTURING COMPANY, INC.** *York, Pa.*

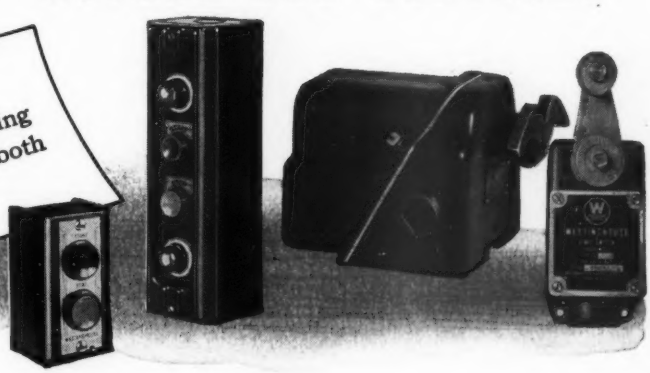

and Motor Control shall be designed to:
1. PROVIDE THE GREATEST RELIABILITY FOR TODAY'S HIGH SPEED WAR PRODUCTION...
that's Westinghouse

MANUAL MOTOR CONTROL
For full voltage, reduced voltage, or step starting, speed regulating, reversing and non-reversing.

MAGNETIC MOTOR STARTERS
For full voltage, reduced voltage, step, reversing and non-reversing.



PILOT CIRCUIT CONTROL
All types of Pilot circuit devices including push buttons and limit switches for both standard and heavy-duty service.



Design features like the Westinghouse "De-ion" principle of arc extinction are certainly a common-sense "must". And today's production goals need the kind of protection that the Bi-metal overload relay can give. The Westinghouse line of a-c and d-c motor controls is complete for motor types that meet requirements of a wide variety of applications.

So when you need motor controls — write "Westinghouse" in the specifications. Then get your Westinghouse representative on the phone. He'll help you all the way from application to installation. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., Dept. 7-N.

J-21270

Westinghouse

PLANTS IN 25 CITIES... OFFICES EVERYWHERE

MOTORS AND CONTROLS

Instantaneous Dumping... High Speed Loading...

PROVIDE ESSENTIAL WAR SPEED

When war speed is essential Koehring Dumptors have the potential power to provide it. Easy operation . . . plenty of dependable horsepower . . . and instantaneous dumping are a few of the features required in high speed hauling. Instantaneous gravity dump saves time as well as repair costs. Wide body top opening saves time when loading. War construction demands speed and Koehring Dumptors are constant performers where speed is essential.

KOEHRING COMPANY
Milwaukee, Wisconsin

Depend on your Koehring distributor to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

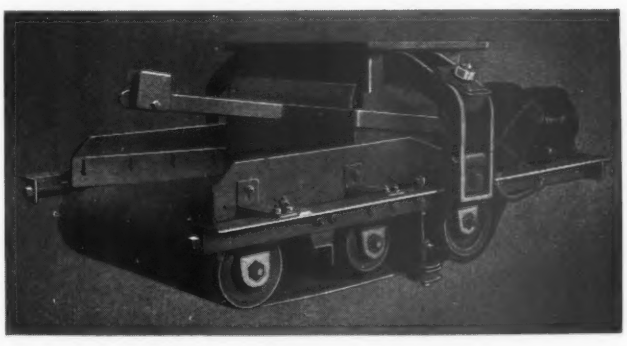
HOW TO INCREASE EXISTING GRINDING MILL CAPACITY

Excerpt from a published statement of a cement mill superintendent:—

"The compartment mills at one of our plants were equipped with sling type or 'cradle' feeders. These feeders were not positive enough, as the amount fed would vary greatly due to variations in the size of the clinker handled. There was no way of gauging the amount of clinker being fed. We have corrected this condition by installing Constant Weight belt feeders, and obtained a substantial improvement in mill capacity."

The Constant Weight Feeder is a Hardinge product. It may also be equipped with a weight totalizing and rate recording device at but slight extra cost.

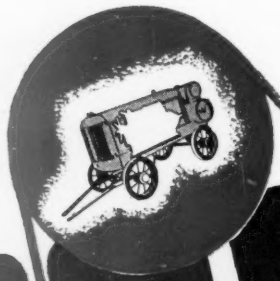
Write for Bulletin 33-C



HARDINGE

COMPANY, INCORPORATED - YORK, PENNSYLVANIA

122 East 42nd Street, New York, N. Y.
205 West Wacker Drive, Chicago, Illinois
501 Howard Street, San Francisco, California
200 Bay St., Toronto, Ontario, Canada



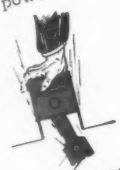
COMPACT

BUDA *Low Pressure* DIESEL

• If you've shied away from Diesels because of their size and weight, take a close look at this trim, compact BUDA. Lower cylinder pressures eliminate the usual Diesel overweight cylinders and head; smooth, prolonged "low pressure" combustion means longer life from smaller, lighter castings and moving parts. There's a trim, compact BUDA from 20 to 340 hp to fit your job — see your BUDA distributor for details!

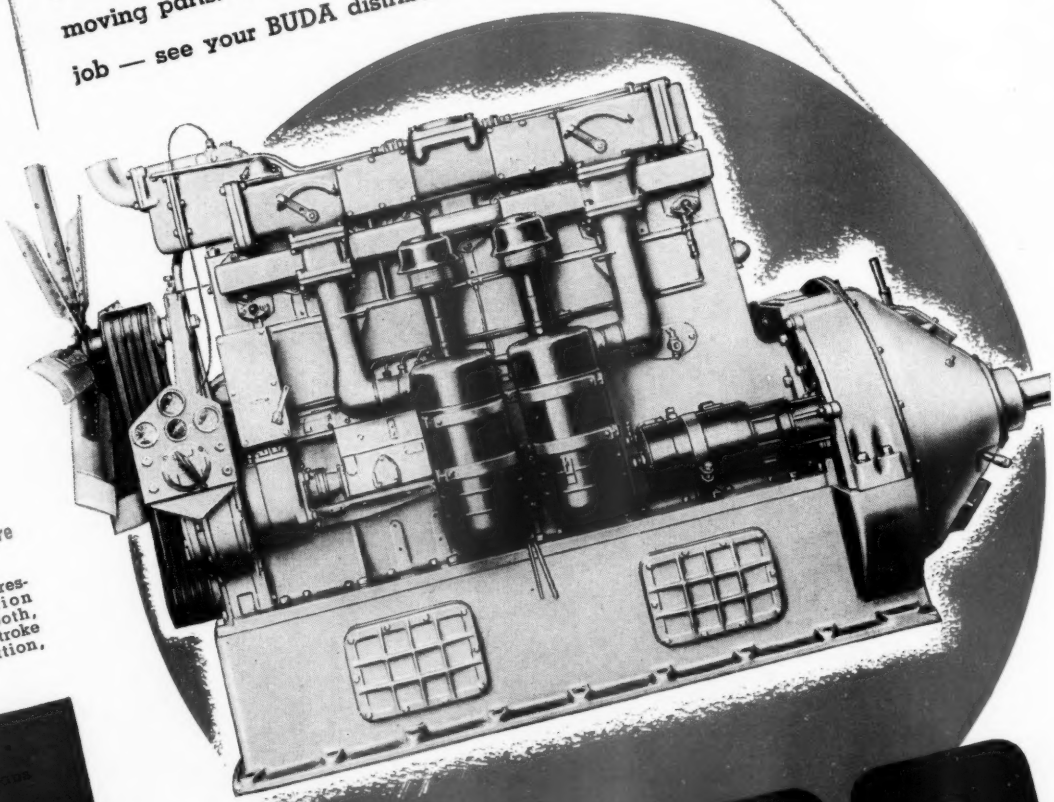
ORDINARY DIESELS

. . . High cylinder pressures produce sledge-hammer blows that punish pistons, rods and crankshaft every power stroke.



BUDA Low-Pressure DIESELS

Prolonged "low-pressure" combustion delivers a smooth, steady power stroke that cuts vibration, saves parts.

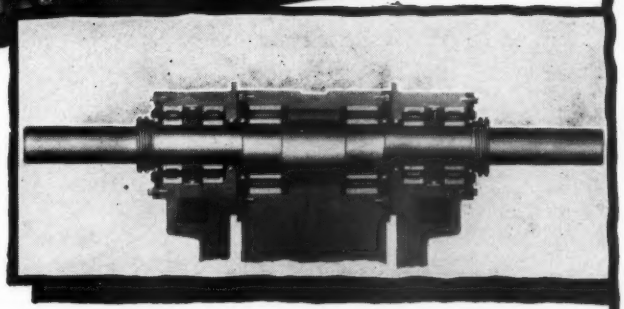


BUDA

HARVEY (Chicago Suburb) ILLINOIS

ANOTHER OUTSTANDING UNIVERSAL PERFORMANCE RECORD:

29,000 hours of crushing with one set of bearings!



A Universal Series "SL" Roller Bearing Crusher with 10″x24″ feed opening in the New York State plant of the Loomis Talc Company crushed 204,102 tons of magnesium silicate for war needs, representing 29,000 hours of operation, on the original set of bearings supplied with the crusher.

Proof again that Universal-engineered "6 bearing" design—two on the pitman and two on each side of the frame—*gives greater bearing service life, lower maintenance cost and increased output.*

With any rock, gravel or rubble, you can make "little ones out of big ones" faster and cheaper with Universal Crushers. Let us send you facts!

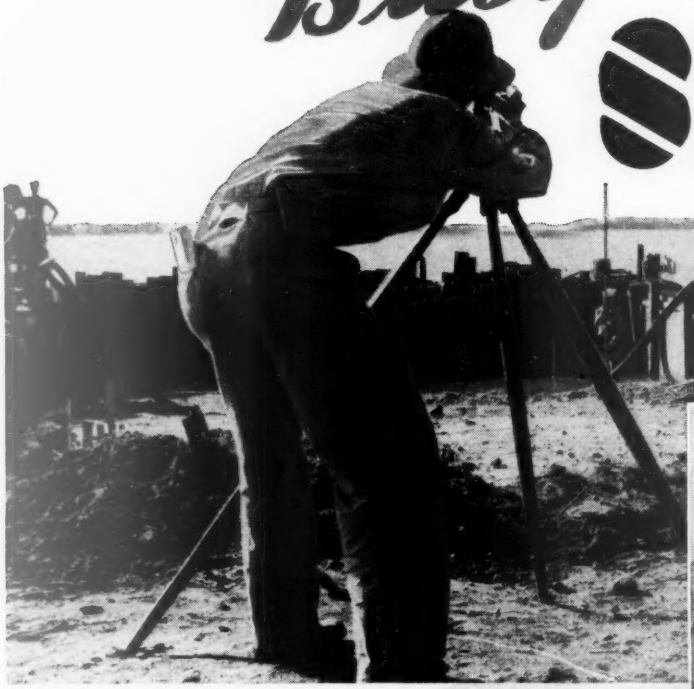
UNIVERSAL ENGINEERING CORP.
(formerly Universal Crusher Co.)
619 C Ave. West, Cedar Rapids, Ia.

UNIVERSAL

CRUSHERS, PULVERIZERS, COMPLETE PLANTS, SPREADEROLLERS, PORTABLE ASPHALT PLANTS

AWARDED ARMY E NAVY FOR EXCELLENCE AND PROFICIENCY

Busy as a SEABEE!

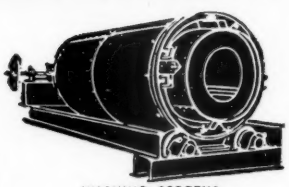


OFFICIAL U.S. NAVY PHOTOGRAPHS

● What a soft job the original "busy little bee" had. Nothing to do but "improve each shining hour." Did he ever have to land on a hostile beach . . . right on the heels of the marines . . . with a machine gun in one hand and a monkey wrench in the other? And then go right to work . . . in the tropical jungle . . . often under fire . . . building anything from an airplane landing field to a gun emplacement! That's what the Seabees are doing. They're the Construction Battalion of the U. S. Navy —recruited from the construction and repair trades to do a big job for their Uncle Sam. And recruited to build with them is Telsmith equipment.

Crushers, vibrators, screens, elevators, gravel washers, sand tanks— all types of Telsmith aggregate-producing machinery—portable and semi-portable plants—complete stationary sand and gravel and rock crushing plants for building the Navy's large shore facilities overseas. For your war work over here—Telsmith equipment is also available. Get Bulletin E-15.

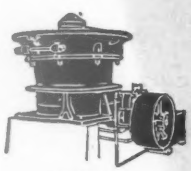
CBE-3



WASHING SCREENS

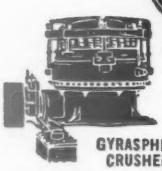
SAND CLASSIFIERS

VIBRATING SCREENS

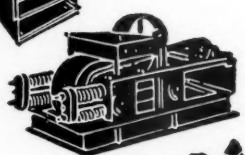


PRIMARY BREAKERS

JAW CRUSHERS



GYRASPHERE CRUSHERS



ROLL CRUSHERS

BELT AND BUCKET ELEVATORS

TELSMITH Equipment

FOR SAND, GRAVEL, ROCK CRUSHING PLANTS

SMITH ENGINEERING WORKS, 504 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

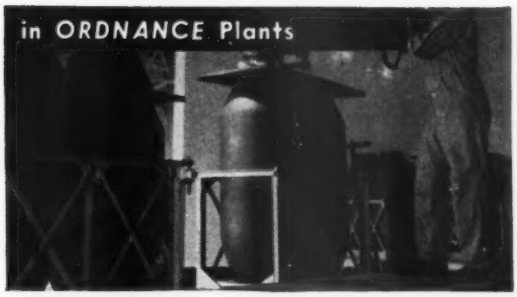
Room 1604—50 East 42nd St. New York 17, N. Y.
211 W. Wacker Drive Chicago 6, Ill.
713 Commercial Trust Bldg. Philadelphia 2, Pa.
19-21 Charles St. Cambridge 41, Mass.
G. F. Seeley & Co. Toronto, Ont.
Mines Eng. & Equip. Co. San Francisco 4—Los Angeles 14
Brandeis M. & S. Co. Louisville 8, Ky.
Charleston Tractor & Eqpt. Corp. Charleston 22, W. Va.
Roanoke Trac. & Eqpt. Co. Roanoke 7, Va.
Clift L. Priester 911 S. 3rd St., Memphis, Tenn.
Wilson-Weesner-Wilkinson Co Knoxville 8 and Nashville 6, Tenn.

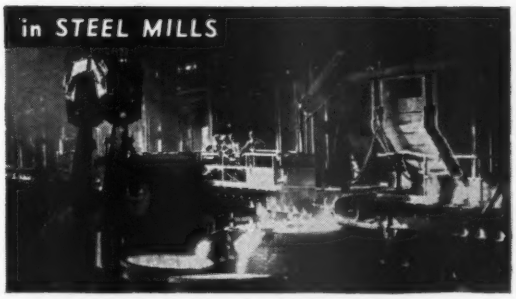
Here Are

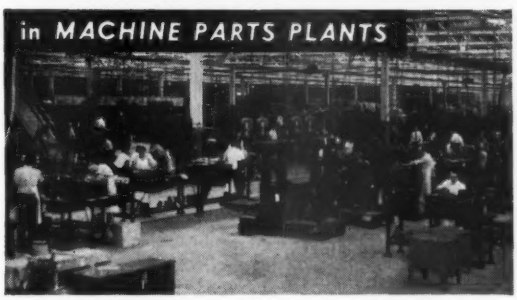
A Few of the Industries

in which

GATES V-BELTS *of* Synthetic Rubber







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Five years before natural rubber supplies began to be curtailed, Gates was already supplying many industries with large quantities of V-Belts made entirely of synthetic rubber.

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You scuttled a Nazi Ship of *Hate*

MEN of Denmark, they never knew you . . . the iron in Danish hearts. Your native spirit flourished under Nazi-imposed "self-rule." Then you struck . . . a vital blow for the rebirth of a free Europe.

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Yes, mining and mining men will speed *your day*—for *Victory Begins Underground!*

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EDITORIAL-ADVERTISING TIE-IN MAKES IT EASY FOR BUYERS TO GET COMPLETE INFORMATION ABOUT YOUR PRODUCTS
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1944 THIRTY-SEVENTH EDITION
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Day after day, week in and week out, for 12 full months, the Pit and Quarry Handbook is a constant source of tested production ideas and practical operating and maintenance methods.

BUT IT IS MORE THAN JUST THAT — the men who read the Handbook consult it for a purpose. Consequently, your catalog advertisement, facing an authoritative technical article dealing with the problem your product is designed to solve, strikes the reader at the exact moment that he is most inclined to buy.

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MANUFACTURERS ARE URGED to tell their complete product story in this successful sales producer. The 1944 Handbook is now in preparation. Make sure that all your suitable products are shown and that your catalog copy appears in every section dealing with processes in which these products are used.

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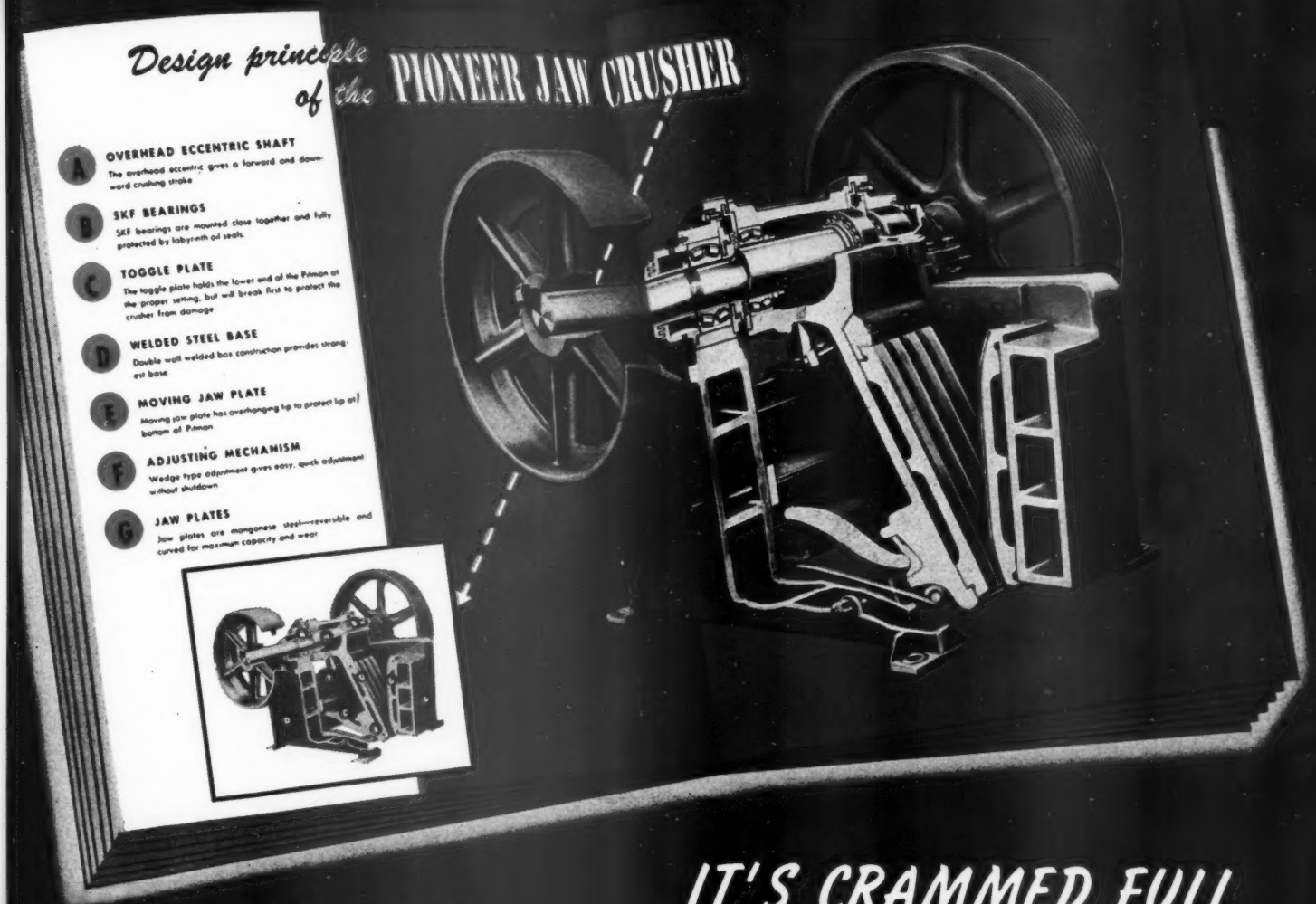
Design principle of the PIONEER JAW CRUSHER
A OVERHEAD ECCENTRIC SHAFT
The overhead eccentric gives a forward and downward crushing stroke
B SKF BEARINGS
SKF bearings are mounted close together and fully protected by labyrinth oil seals.
C TOGGLE PLATE
The toggle plate holds the lower end of the Pitman at the proper setting, but will break first to protect the crusher from damage
D WELDED STEEL BASE
Double wall welded box construction provides strong base
E MOVING JAW PLATE
Moving jaw plate has overhanging lip to protect lip of bottom of Pitman
F ADJUSTING MECHANISM
Wedge type adjustment gives easy, quick adjustment without shutdown
G JAW PLATES
Jaw plates are manganese steel—reversible and curved for maximum capacity and wear

IT TELLS YOU . . . . .

- How a Jaw Crusher Operates
- Why the Overhead Eccentric Crushes More Rock
- How the Screw and Wedge Adjustment Saves Time
- Why the Double Wall Welded Base is Stronger
- How SKF Bearings Take End Thrust as Well as Radial Load
- Why Self Aligning Bearings Are Essential
- How the Labyrinth Seals Protect the Bearings
- How New Jaw Design Protects the Pitman Lip

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of pertinent data—photographs and drawings.

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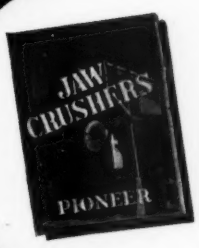

To PIONEER ENGINEERING WORKS
1550 Central Avenue
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Please send us a copy of "Pioneer Jaw Crushers".

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ENGINEERING WORKS
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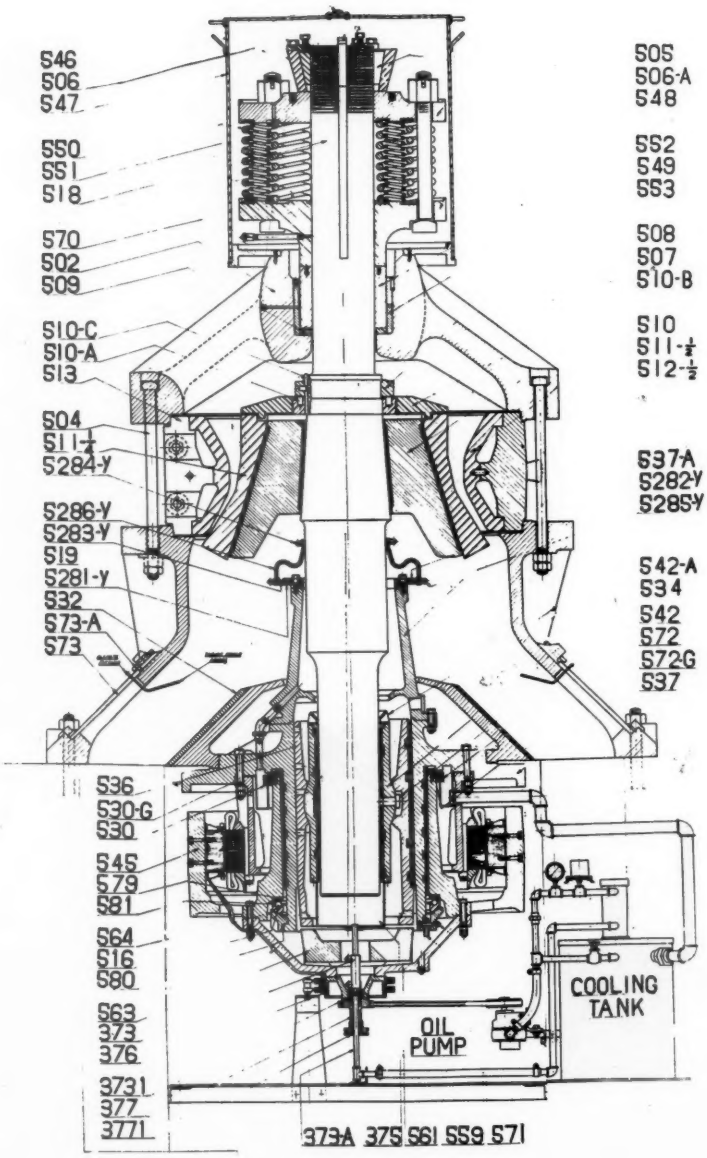
Look Into a Kennedy Reduction Ball Bearing Gearless Crusher

A POSITIVE OILING SYSTEM

The oiling system of the Kennedy gearless crusher is positive, simple, and fool-proof. The oil is continuously filtered and cooled. A simple gear pump draws the oil from a serpentine-cooled tank and under pressure pumps it through a filter and, by suitable conduit, to a compartment that fits below the ball socket bearing. The oil is forced up this bearing around the shaft whence it overflows to the eccentric and pulley bearings, flooding the ball bearing and finally overflowing to the storage tank. Provision is made with a by-pass to release the pressure back into the storage tank, thus maintaining constant and even flow at all times. An electrical signal is connected in the circuit so that if the oil pressure is failing, a warning is given the operator by horn or light or both, as conditions demand. Prompt attention to any irregularity can save the bearings of a crusher.



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Quaker is as anxious as anyone to turn production back to take care of the needs and demands of the civilian trade. The Allied Forces in their combined drives, are dealing some very telling effects. Events are on the swift move. Each day is counting in a big way. Perhaps the final score will be settled in a much shorter time than many of us anticipated, and bring that day of complete Victory, which we all know will eventually arrive.

Our entire group of friends with whom we do business, almost without exception, recognize and appreciate what Quaker is doing to keep Industrial Rubber Goods flowing to them, and we deeply appreciate their spirit of cooperation, and are eagerly looking forward to that day when we can give the service that normal conditions permit.

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Quaker was founded in 1885 with the keynote of supplying quality merchandise to the trade. Our growth has been steady throughout the years... today, we have thousands of satisfied customers, many of whom have been buying their rubber products from us for a quarter century and longer. • With our 9,001 various items of Belting, Hose, Packings and Moulded Parts, Quaker offers a complete line for the Sand, Gravel, Stone and kindred fields with whatever may be desired in Industrial Rubber Products. • Even in these strenuous days—if there is a way to get it done, Quaker will do it.

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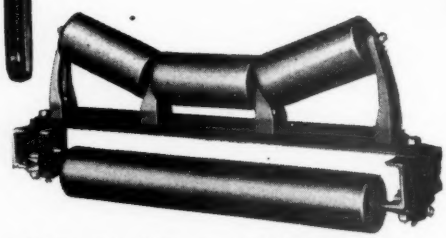
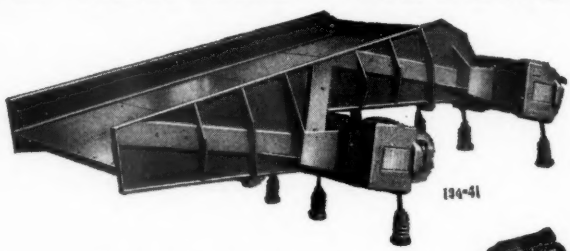
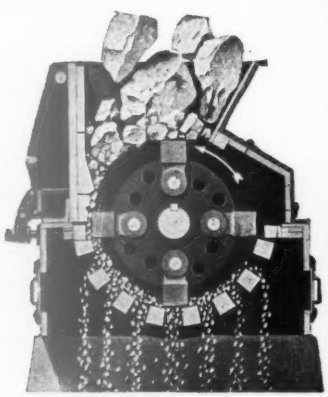
A type and size chain for every conveying, elevating and power transmission need.



Jeffrey belt idlers are furnished in both troughing and flat belt types in widths from 14" to 60". Heavy steel rolls, accurately balanced and equipped with Timken bearings.



Jeffrey-Traylor electric vibrating feeder (patented) J-T feeders ideal for handling large run-of-quarry material from surge hoppers to primary crushers, hammermills, trommels or grizzlies. Special large feeder (above) for handling 48" lumps at rates up to 2000 T.P.H. with maximum of 15 HP required.



Jeffrey-Traylor grizzly feeder (right) for by-passing fines ahead of primary and secondary crushers, screens, picking belts. Also electric vibrating screens and feeders (patented). The Jeffrey Miracle hammer crusher (left) is used for reducing large pieces of limestone, shale, slag and cement rock. Steam shovel size to 1", 2", 3" or 4" and under in one operation.

Operating conditions, capacity or class of material make no difference—there is a Jeffrey bucket elevator to do the job. A complete line of standardized units. An inclined continuous elevator is shown right.

THE JEFFREY MANUFACTURING COMPANY

(Established in 1877)

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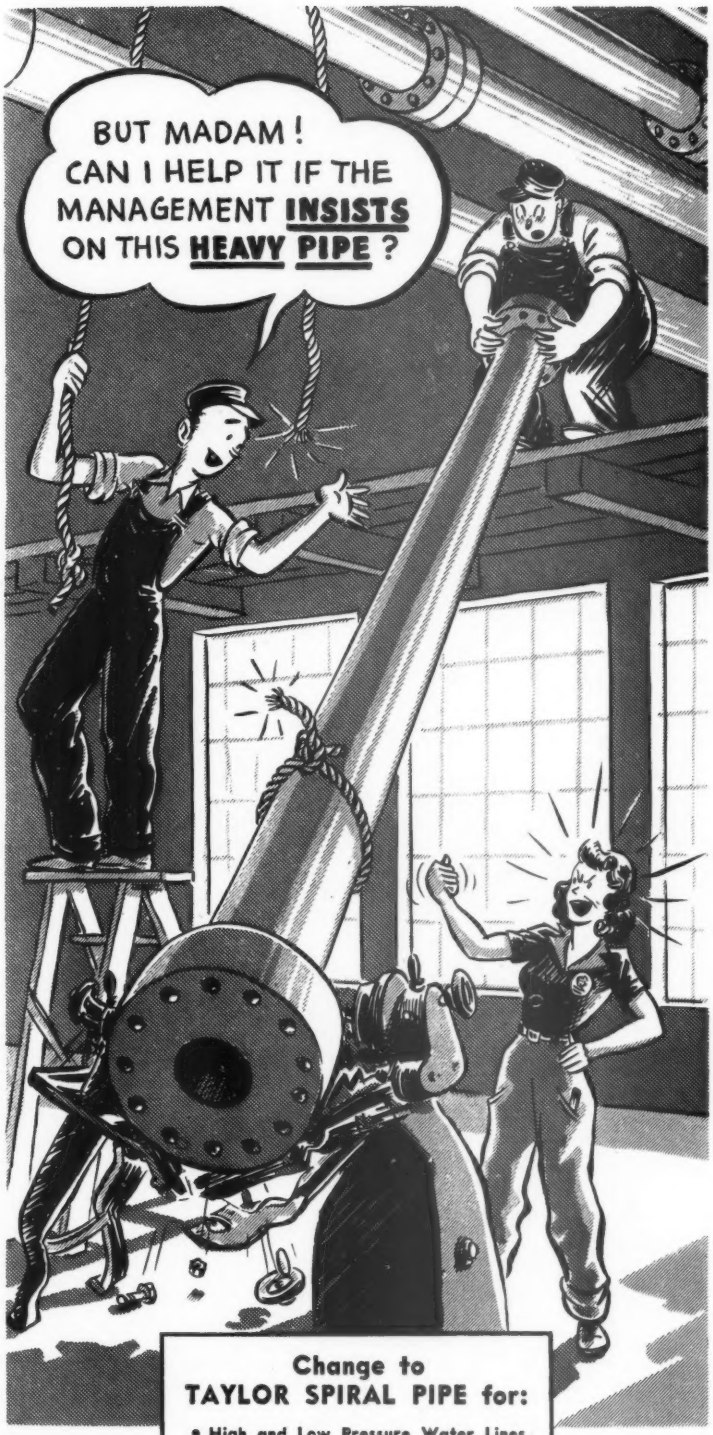

Change to TAYLOR SPIRAL PIPE for:

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There are far better reasons for using TAYLOR SPIRAL PIPE!

THE all-time, all-American reason for using Taylor Spiral Pipe is to save dollars. Just now an equally good one is to conserve steel. As a matter of fact it would be hard to find any reason for *not* using this light-but-strong pipe for the applications to which it is adapted.

And the applications are broader than most people realize. They include services like water, air, gas, low pressure or exhaust steam piping, and other uses like those listed below. Many people find it difficult to associate Taylor Spiral Pipe with some of these uses—too often think in terms of their old side-kick, Standard Thickness Pipe, for the ordinary run of piping needs. But isn't this simply a tradition carried over from the days when weight was synonymous with strength and material was abundant?

If you don't think so consider this: It has been proved in hundreds of applications that light-but-rugged Taylor Spiral Pipe can handle the everyday range of services with strength and service life to spare. It has also been proved that its lighter weight cuts costs way down—often to as little as half that of the heavy pipe it so well replaces!

Next time a job of this kind comes up consider Taylor Spiral. You'll find that there is a size and gauge for every need. Thicknesses range from 18 to 6 gauge; joint lengths to 40 ft. All types of end joints, all kinds of fittings and "specials" or fabricated assemblies are produced, providing a complete service with undivided responsibility.

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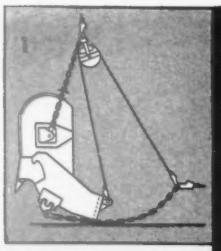
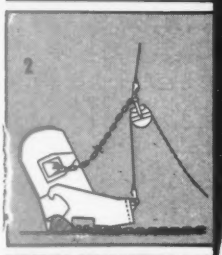
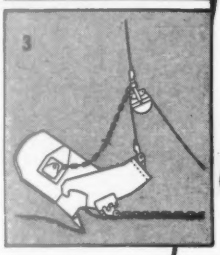
TAYLOR *Spiral* PIPE







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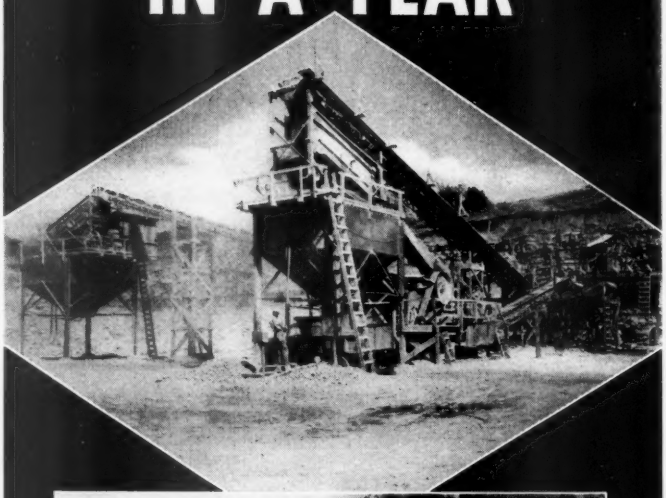

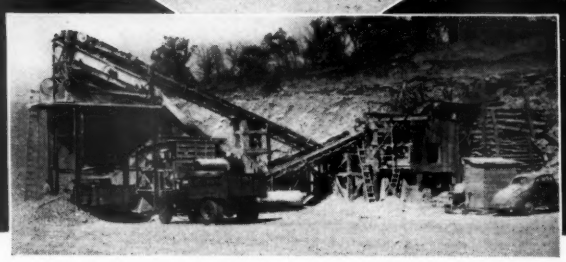

4000 PLUS TONS PER DAY WITH THIS DOUBLE DIAMOND STATIONARY PLANT

The scene is a large ordnance project in the Midwest. The time is short for the immensity of the job—1,500,000 tons to be crushed and classified within a year. There is no lee-way for delays or breakdowns. The pressure is on for maximum production ALL day — EVERY day! These two Stationary Quarry Plants are 100% DIAMOND, and they are standing right up to schedules with an output of 4,000 tons *plus* per day.

Maybe you don't need to get out 1,500,000 tons in a year,—but you do need DIAMOND'S time proven design, rugged durability and non-stop performance that makes such records possible. Depend on DIAMOND — and your customers will depend on you.

DIAMOND STATIONARY PLANT NO. 2 (TOP VIEW)

Primary Jaw Crusher, DIAMOND 24 x 36 with DIAMOND Apron Feeder.
Secondary Jaw Crusher, DIAMOND 10 x 36
Roll Crusher, DIAMOND 40 x 42
Main Vibrator, DIAMOND 2-deck, 4 x 12
Auxiliary Vibrator, DIAMOND 1-deck, 4 x 10
Bins, DIAMOND Jack Leg, 50 yard capacity
DIAMOND Belt Conveyors

DIAMOND STATIONARY PLANT NO. 3 (BOTTOM VIEW)

Primary Jaw Crusher, DIAMOND 24 x 36 with DIAMOND Apron Feeder.
Roll Crusher, DIAMOND 40 x 22
Vibrator—DIAMOND 1-deck, 4 x 12
Bin—DIAMOND Jack Leg, 50 yard capacity
DIAMOND Belt Conveyors

Your success or failure depends largely on your plant. Why be satisfied with anything less than the performance of a 100% DIAMOND Plant?

● DIAMOND also makes portable plants in many sizes and types.

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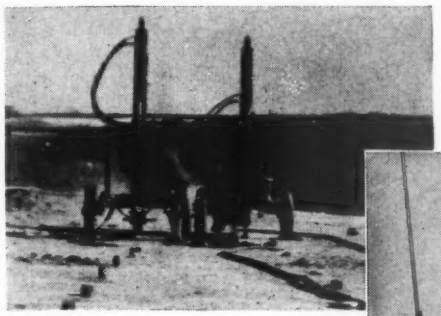
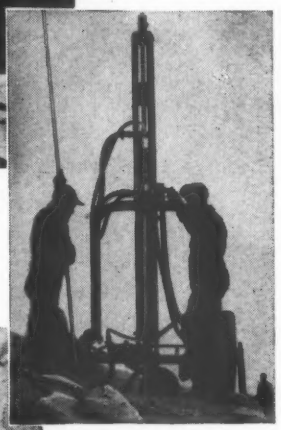


Accurate Spotting



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Toe Holes

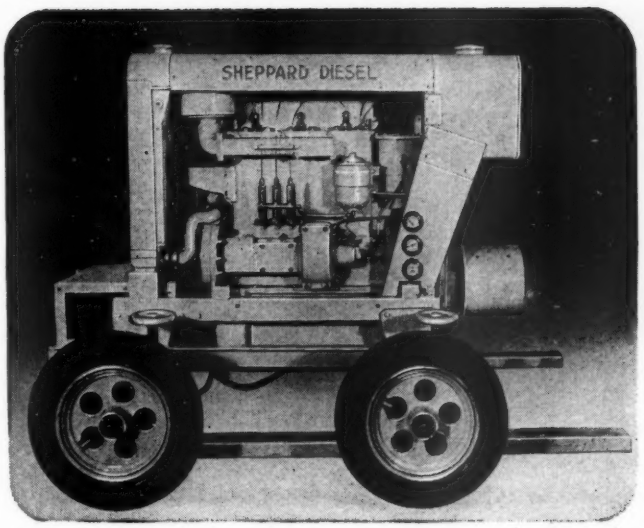
Sixty-seven pounds of speed and power—Gardner-Denver S-73 Sinker—for faster drilling in hard rock.

Horizontal Drilling

For complete specifications on Gardner-Denver Wagon Drills and Sinkers, write Gardner-Denver Company, Quincy, Ill.

GARDNER-DENVER

Since 1859



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PIT AND QUARRY

Vol. 36 NOVEMBER, 1943 No. 5

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PIT AND QUARRY IS INDEXED IN THE ENGINEERING INDEX

Maintenance Costs
HIT ROCK BOTTOM!

SOLNUS OILS

End Costly Carbon Troubles in Quarry Diesel

Diesel engines in quarry service operate under severe conditions . . . due to dust, temperature extremes and hard usage . . . resulting in difficult problems of lubrication and maintenance. Sun Lubricants and Sun Engineers have been successful in helping to overcome such problems in many quarry power plants.

In one instance, the diesel supplying power for a giant stone crusher had been lubricated by three nationally-known, high-quality diesel oils. With each of these oils, excessive hard carbon and gum deposits caused sticking rings and loss of power. Every time the engine was overhauled, it was necessary to *break* the rings to free them, resulting in high annual replacement costs.

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This field report is typical of the many which we receive every year. It suggests that SUN Lubricants and SUN Engineers . . . those capable "Doctors of Industry". . . may be able to help you solve your difficult lubrication problems. Write to . . .

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EDITORIAL

Will There Be Jobs?

RECENTLY it has been our privilege to read a few letters received by friends who have relatives in combat duty outside the United States. Several of them are revealing and enlightening to those of us who have remained at home and are wondering how it feels to wait for hours expecting the order to act, how it feels to end another man's life, how it feels to disregard all dangers to one's own. Few of these letters written in an atmosphere of realism speak of such commonplaces, and apparently the questions that seem most interesting to us are the ones about which they in the face of death care little or nothing. They speak the minds of realists, men who have overcome their fears of death but worry about their lives after a victorious return home, men who are trying to find an element of certainty in a future which they may never live to experience.

Their hope for a future after the war never fails, but their faith in what that future will hold for them never rises to the height of conviction. Will there be a real peace? Will there be true freedom for all? Will there be a genuine democracy? Will there be an end of discrimination based on creed, on skin color, on nationality, on economic status? To all these questions they offer a confident affirmative; these are the objectives of this war, they say, and, even though they are realists, they believe that they will achieve them through military victory.

But, as the letters we have seen reveal, there is a greater question, one for which they have not found the answer. Will there be jobs? Will they be returned to the jobs they left? is a question that troubles every man who had a job. Will there be any jobs for us? ask the men who were too young to have worked before. Thus speak men who have dedicated their lives to the achievement of great goals, men who, willingly facing the threat of the supreme sacrifice, nevertheless think of the most realistic problem of all—self-preservation after the war.

Will the end of hostilities bring an end to full employment, too? Will the present war-begotten "boom" be followed by a lull, another equally temporary splurge, a long-drawn-out period of readjustment, or collapse? Are we stay-at-homes doing anything constructive to prevent economic instability? Are we thinking and striving with the object of insuring the existence after the war of an economy in which the fears of unemployment will be dispelled? Such are the fears expressed, sometimes clearly and sometimes vaguely, in the letters we have seen.

The same questions bother men at home. Millions of persons who never worked before, millions of others who had not worked for years, the millions who now have full-time employment—many at high rates of pay and many with long hours of well-paid overtime—are troubled about the future, the post-war future. Because of constantly rising living costs and constantly rising taxes and the threats of new increases in both, because of their desire to do more and more in financial support of the war, these people feel no sense of security even in the present to say nothing of the future. With prices and taxes rising while earnings are frozen, whatever surplus remains becomes ever smaller, so that the prospect of post-war unemployment fills them with dread.

Men who are old enough to remember the 'thirties wonder whether there will be another collapse, with its W. P. A., its relief, its lack of economic opportunities. Men who are not so old wonder whether private industry will be able to provide those opportunities, whether there is not some way to prevent the economic paralysis they have heard about but do not quite understand. All men read of great technological advances made during the last decade and of others just emerging. What of them? Will they produce the same kind and same degree of technological unemployment that reached its zenith during the last fifteen years?

As business men, Americans and realists, we are concerned about these fears. We are concerned because we wonder if they will be met by careful, intelligent and unselfish analysis, planning and execution, or whether they will be allowed to grow and pass from the field of the intellect into that of the emotions. We feel a sense of great responsibility resting upon us, even though as individuals we have but small voices and little effectiveness, and we realize that as individuals we can do little more than talk about the subject. Yet we are hopeful. The very fact that these fears are being openly expressed and discussed promises much for the future. The fact that the most realistic of us all—the men at the fronts of fighting and production—are experiencing these fears and discussing what might be done to prevent the horrible insecurity that they dread seems to us to prove that something will be done about it. When serious men face serious problems some serious remedies will come to light.

AND there is where our concern arises. Can we as business men become sufficiently realistic to understand this problem and to propose a remedy that can and will be made effective? Can we get ourselves into a frame of mind that will make possible an unemotional approach to this problem and the adoption of plans that will show less regard for the traditional concepts of the past than for the realities of the future? Business men in hundreds of industries have associated themselves for the attainment of ends that they considered worthy and important for themselves as groups. Can not enough men of equal intelligence and determination gather for the solution of a problem that affects not only themselves but the welfare of the nation as a whole? Are we willing to give now the time and effort that the adoption of an equitable solution demands? If not, we can be certain that whatever remedy is adopted without our coöperation will not be to our liking.

In war or peace
B.F.Goodrich
FIRST IN RUBBER

First and only grommet-type wire V belt

For use where others have failed and where V belts have never before been possible

Transmits more h. p., has greater strength, no stretch, needs less maintenance

THIS new V belt is made with the grommet principle, a B. F. Goodrich development that gives greater strength, and transmits more horsepower for a given size of belt.

Ordinary wire V belts are made by winding a continuous wire around a drum, then cutting into narrow sections to form the individual belts. Thus in ordinary belts there is a point on each side where the wire is close to the edge. The B. F. Goodrich grommet is made by forming wire cable into a loop, then winding it spirally on itself up to the needed size. It's endless; in the belt it is always the same distance from the edge (wires will never be exposed by slight wear); it has less stretch than small individual cables, more strength for a given amount of wire. Thus it transmits more horsepower for a belt of given size.

The wire grommet, spirally wound in one direction, is covered by cord spirally wound in the other direction. Thus each grommet is balanced—and each belt is balanced.

Strongest V belt ever made

This new principle makes the strongest V belt ever produced in proportion to size and weight. The well-known V belt advantages of efficient power transmission, low maintenance, long trouble-free life, quiet and clean drives, less weight are now available for many drives which have always had to put up with heavier, costlier methods.

If you have drives on which other belts have failed — or drives on which lack of strength has made former V belts impractical — write B. F. Goodrich. Our belt specialists will help you engineer this revolutionary new belt to your drives to give you greater power efficiency, and save you money, trouble and production time. *The B. F. Goodrich Co., Industrial Products Division, Akron, O.*

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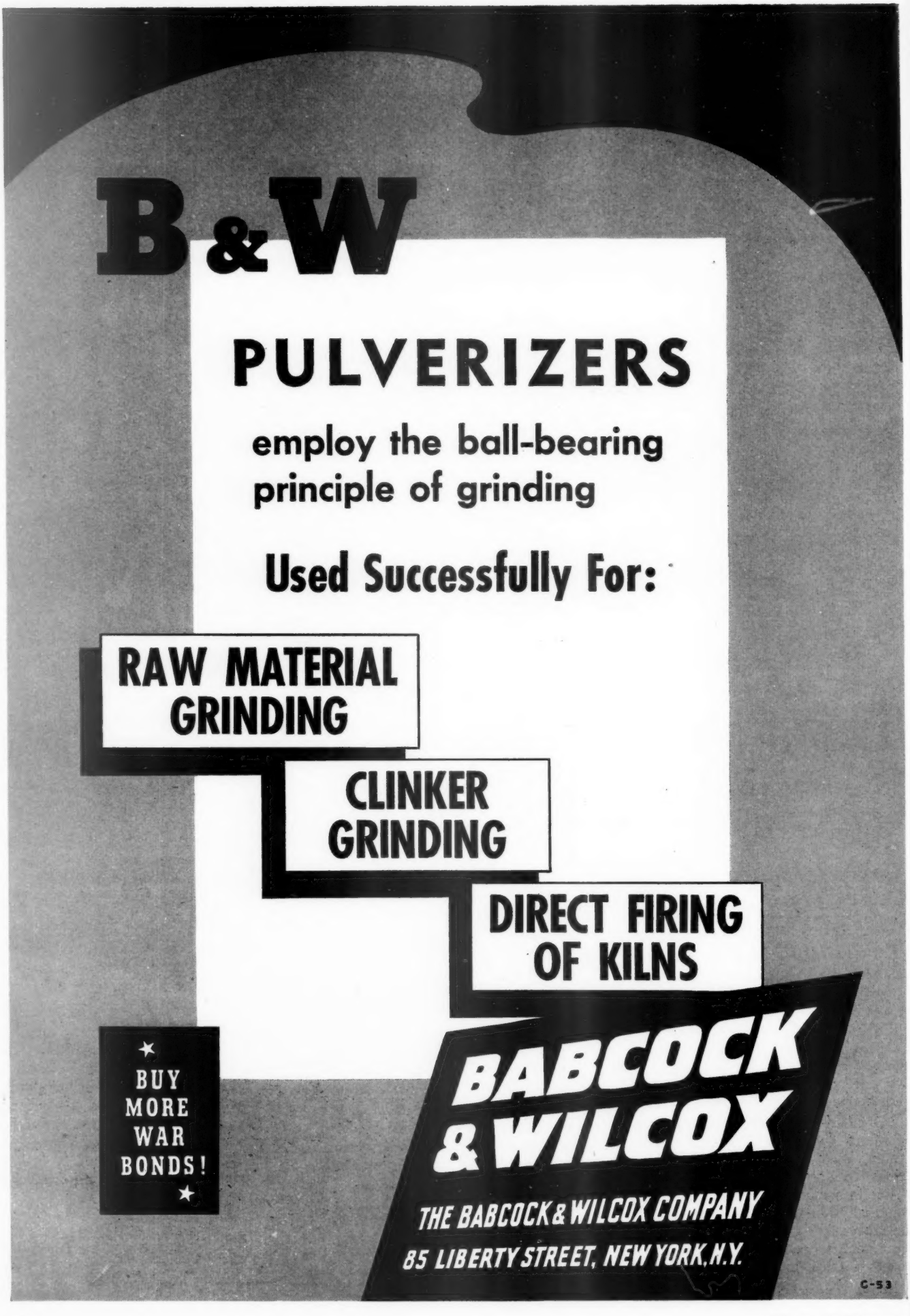
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employ the ball-bearing principle of grinding
Used Successfully For:
RAW MATERIAL GRINDING
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C-53

Slag Association Adds Engineer to Washington Staff

Combining a special fall meeting of the board of directors of the National Slag Association with its annual meeting (usually held in January or February of each of the past twenty-six years), that organization met October 13 and 14 at the Wardman Park Hotel in Washington, D. C. The speaker at the banquet on the evening of the 13th was Charles Upham, engineer-director of the American Road Builders' Association. It was announced at the meeting that A. G. Timms, formerly with the Portland Cement Association, would be added to the staff of the National Slag Association in Washington, D. C., in the capacity of office and field engineer.

Officers elected were: president, L. E. McDermut; vice-president, Fred Hubbard; managing director, H. J. Love. Mr. McDermut is president of the Illinois Slag & Ballast Company, Chicago; Mr. Hubbard is consulting engineer with the Standard Slag Company, Youngstown, Ohio; Mr. Love resides in Washington, D. C.

The association, it was announced, has been awarded the Certificate of Recognition by the Salvage Division of the War Production Board for its efforts in returning huge quantities of metallic iron to the furnaces to bolster the supply of metal so vitally needed in the prosecution of the war. In 1942, a total of 165,679 tons was recovered, or approximately 24 pounds of metallic iron for each ton of slag processed.

Republic Opens Old Quarry in Alabama

The Republic Steel Company has reopened an abandoned lime stone quarry at Cobb City, Alabama, to supply its plants with an additional source of flux.

The Republic company, which owns the plant, has arranged with the Birmingham Slag Company to operate the quarry. It is located six miles east of Birmingham. The corporation expects a yield of approximately 20,000 tons of stone a month.

Ex-Indiana Operator Dies in Army Crash

Members of the industry will be saddened to learn of the death of Lt. Edward Theobold of Vincennes, Indiana, who was killed recently in a collision of an army jeep with an automobile near Vallejo, California.

The deceased for many years operated the Anderson - Theobold Sand & Gravel Company of Vincennes where burial took place.

Fire caused $5,000 damage recently when it swept the Oakland, California, warehouse of the Henry Cowell Lime & Cement Company.

Coming Events

November 27-30, 1943—Chicago. Twenty-third annual meeting, Highway Research Board, Edgewater Beach Hotel.

January 25-27, 1944 — New York. Annual convention, National Sand & Gravel Association, Hotel New Yorker.

January 26-28, 1944—New York. Annual convention, National Ready Mixed Concrete Association, Hotel New Yorker.

January 31-February 2, 1944 —New York. Annual convention, National Crushed Stone Association, Hotel New Yorker.

Opens New Quarry to Supply Railway Ballast, Rip-Rap

A new stone quarry has been opened at Wyalusing, Wisconsin, by the E. C. Schroeder Co., Inc., of McGregor, Iowa, to produce ballast stone and rip-rap for the Chicago, Burlington & Quincy Railroad. The railroad intends to rip-rap and rock ballast most of the railroad embankment along the right of way from Savanna, Illinois, to St. Paul.

It is estimated that about 100,000 tons of ballast stone will be needed yearly to properly ballast the tracks, while 50,000 to 100,000 tons of rip-rap will be needed to hold the embankment in good condition.

Pennsylvania Producers Hear E. W. Baumann

The Pennsylvania Stone Producers' Association held a meeting September 23, at Harrisburg, Pa., which included a session at the Penn-Harris Hotel and an outing at the West Shore Country Club in the afternoon.

E. W. Baumann, chief of the nonmetallic section, mining division, War Production Board, spoke on the board's regulations as they affect the stone industry. A. T. Goldbeck, engineering director of the National Stone Crushed Association talked on engineering developments.

Salem Plant Sold to Cleveland Concern

The Salem Lime & Stone Company, which was organized more than 20 years ago, has sold its plant, located one mile west of Salem, Indiana, to the Ric-Wil Company of Cleveland.

Possession was taken October 1, with C. G. Everhard of Barberton, Ohio, as plant manager. The new firm will operate under the old name of Salem Lime & Stone Co.

G. C. Huth Directs Industry Relations at Universal Atlas

Blaine S. Smith, president, Universal Atlas Cement Company, has announced the retirement on September 20 of Edmund D. Barry, manager of industrial relations after 40 years continuous service with the company and the appointment of Gordon C. Huth, assistant manager of industrial relations as his successor.

After several years devoted to ship building Mr. Barry joined the cement department of the Illinois Steel company in 1903 at the old No. 2 plant in South Chicago, now dismantled. Following two years of general duties, he became superintendent of that plant in 1905. In 1907 he went to Pittsburgh for work

Edmund D. Barry

Gordon C. Huth

in connection with the construction of the new plant at Universal, Pennsylvania, of which he subsequently became superintendent. In 1930 he was appointed assistant operating manager of the entire company and in 1937 was appointed manager of industrial relations, from which position he is now retiring.

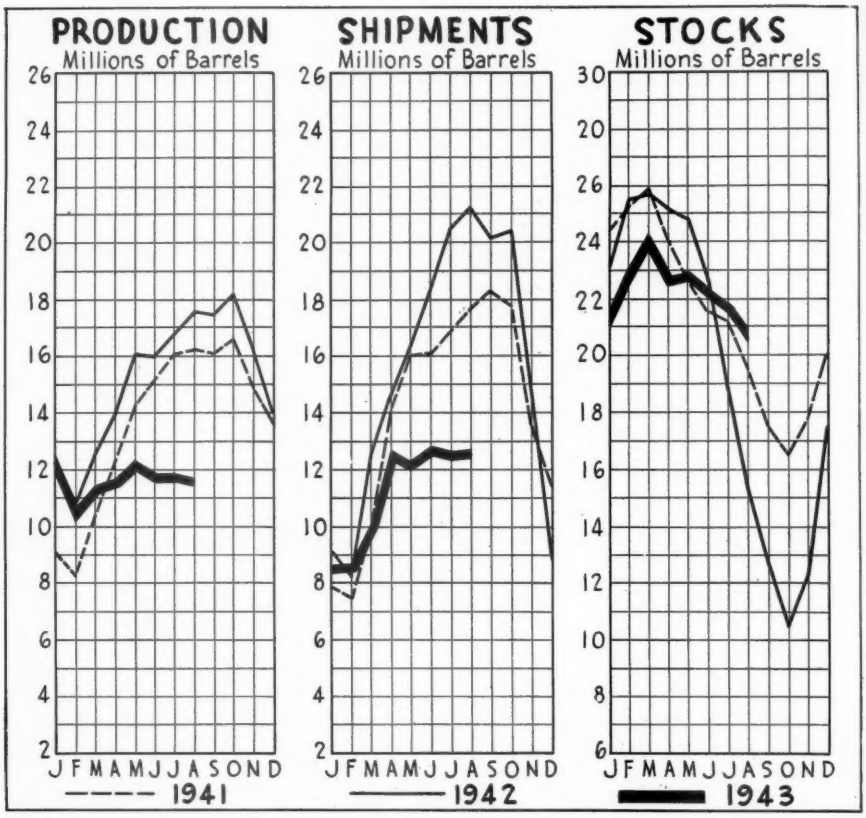
Mr. Huth was born in Superior, Wisconsin, and started with the company in 1915 as machinist helper at the Duluth plant. After working in the chemical laboratory and in the safety and labor department, and after service in the army in World War I, he became supervisor of safety and labor at the Duluth plant in 1919. In 1930 he was appointed manager of safety and casualty for the entire company and became assistant manager of industrial relations in 1937.

Paid Circulation of Pit & Quarry Among Nonmetallic - Mineral Producers in Recent Years:

CONTINUOUSLY FOR 26 YEARS THE LARGEST PRODUCER CIRCULATION IN THE FIELD

1942	(November)	6,650
	(May)	6,513
1941	(November	6,179
	(May)	5,945
1940	(November)	5,307
	(May)	5,037
1939	(November)	4,641
	(May)	4,617
1938	(November)	4,496
	(May)	4,366
1937	(November)	3,971
	(May)	3,772
1936	(November)	3,654

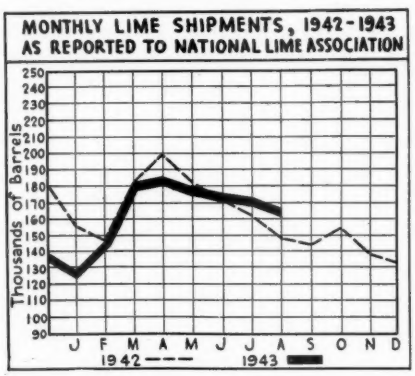
82% increase in 6 Years



The Portland-cement industry in July, 1943, produced 11,880,000 barrels, shipped 12,411,000 barrels, and had in stock at the end of the month, 21,536,000 barrels of finished cement, according to the Bureau of Mines. Production was down 29 per cent. and shipments 39 per cent. compared with the same month of 1942. Stocks on July 31 were 13 per cent. higher. Production of 11,673,000 barrels of finished Portland cement during August, as reported by producers to the Bureau of Mines was 34 per cent. below output in the same month of 1942 and also was slightly lower than in July, 1943. August shipments totaled 12,587,000 barrels, a decline of 41 per cent. from the volume shipped in August 1942. Shipments exceeded production during the month and stocks of finished cement on August 31 declined 914,000 barrels from July 31 to 20,628,000 barrels.

Wins Damages Resulting from Accident in Pit

A $15,000 settlement of a claim for injuries suffered while in the employ of the Great Northern railroad this summer was received September 17 by Arnold K. Anderson, 16 years old of Osakis, Minnesota. The settlement was approved by District Judge Frank E. Reed of Minneapolis. The youth was employed during the summer vacation in a gravel pit operated by the railroad company ten miles west of Evansville, Minnesota, and on July 6, while attempting to adjust brakes on a gondola car, he was caught between the draw bars of two cars. He lost his left arm and suffered severe lacerations on his left thigh.


MONTHLY LIME SHIPMENTS, 1942-1943
AS REPORTED TO NATIONAL LIME ASSOCIATION
Thousands of Barrels
J F M A M J J A S O N D
1942
1943

According to data collected by the National Lime Association, 63 companies in August, 1942, shipped 162,347 tons of lime (107,517 quicklime; 54,830 hydrate). Reporting companies represent 44.1 per cent. of the association's total capacity of record. Based on PIT AND QUARRY'S estimates for the remainder of the industry, the total shipments for the month by all plants were approximately 460,000 tons. Shipments of lime by users for August, 1942, were:

Use	Quicklime (tons)	Hydrate (tons)
Agricultural	1,437	12,791
Building	8,861	18,943
Chemical	97,219	23,096
Total	107,517	54,830

Agricultural-Liming Group Seeking Aid in Meeting Demands

The first meeting of the Agricultural Liming Materials Industry Advisory Committee was held in Washington, D. C. recently. This Committee was appointed by the War Food Administration to consult with it is respect to supplies of liming materials needed for the war food program, and on problems of manufacture and distribution.

In his opening remarks P. H. Groggins of the W.F.A. emphasized the need for maintaining and even increasing the production of these materials to meet the requirements of their food program, and at the same time called attention to the serious falling off in the production of agricultural limestone during the first six months of this year.

Representatives of W.P.B., O.P.A., A.A.A., and O.D.T. were present and gave short talks on the activities of their respective departments in connection with the problems affecting the production and distribution of liming materials. In the general discussion which followed, certain very definite limiting factors were brought out. The most serious was manpower and second in importance was the lack of equipment for distributing liming materials to the farms, including the shortage of gasoline and tires for existing trucks.

Price ceilings also were discussed at some length. These were affecting production, particularly among small manufacturers, many of whom have gone out of business. Affected also were companies that have been selling limestone screenings as a low-priced by-product, but whose present tonnage of the major commodity is not sufficient to maintain the former volume of the by-product material.

It was evident from the meeting that food production is of serious concern to the government and that the production of liming materials for the food program is recognized as being essential to the war effort. Lack of information prevented definite recommendations other than to urge manufacturers to take advantage of the existing provisions of the various war agencies to secure maintenance, repair, and operating equipment; price adjustments, etc. These regulations have been sent to member companies from time to time as they were released. Special committees have been set up to resurvey the problems of the industry and to make recommendations to the full committee later.

Kentland Operator Dies After Attack

C. O. Riggs, 54, superintendent of the Newton County Stone Company at Kentland, Indiana, died recently at his home, death being due to a sudden heart attack. He had been in apparent good health prior to the attack. He was a native of Putnam County, Indiana, and went to Kentland from Greencastle, Indiana, in 1920 and had been engaged in the stone business for 23 years and was widely known to the trade. Mr. Riggs is survived by his widow, one son and one daughter.

Minimum Wage at Leeds Plant Is 57 Cents

The War Labor Board early in September directed the Universal Atlas Cement Company to grant a general wage increase of two cents an hour at its plant in Leeds, Ala. The increase results in a minimum of 57 cents an hour.

In reporting this increase in the October issue, the minimum was erroneously reported as "75 cents an hour" instead of the correct figure of 57 cents.

F. S. Ward Buys Gravel Plant in Michigan

The White Sand & Gravel Company of Maceday Lake, Michigan, has been sold by C. E. White and E. R. Mills, to F. S. Ward.

Mr. Ward is a well-known operator in the Oxford producing district, having been engaged in the production of sand and gravel for more than 20 years in that area.

New Company Formed to Produce Agstone

The Ambraw Limestone Company has been formed at Charleston, Illinois, for the production of agricultural limestone.

Jack Oliver, Carlos Brewer, and Edward McGurty are the owners and operators.

The Pipe Creek Stone Company, Sweetser, Indiana, installed a new Pioneer 40- by 22-inch double-roll crusher in its plant in October. The new machine replaces an older crusher and will be used to make agricultural stone.

V. P. Ahearn Named ATAE President at New York Meet

Vincent P. Ahearn, executive secretary of the National Sand and Gravel Association, was succeeded by Merrill A. Watson, executive vice-president of the Tanners' Council of America, as president of the American Trade Association Executives at the latter group's 24th annual meeting September 23-24 at the Hotel Pennsylvania, New York.

A discussion of post-war problems featured the conclave, with one speaker, Lewis H. Brown, president of the Johns-Manville Corporation, declaring that, contrary to fears of a post-war depression, there is "danger of an immediate post-war boom."

Asserting that "false and unjustified fears" are creating a dangerous and misguided psychology similar to the approach used in meeting the unemployment problem of the 1930's, Mr. Brown declared that entirely different conditions will have to be met when the war ends.

"Unemployment will be practically nonexistent," he said. "Because of years of restricted production for our normal domestic markets there will be huge accumulated shortages that must be supplied, and the job of converting to peace in itself will be a tremendous one."

Gossman Elected Head of Dicalite Company

Announcement has been made by the Dicalite Company that A. L. Gossman has been elected president, succeeding C. A. Frankenhoff who becomes chairman of the board. The two men have practically "grown up" in the diatomaceous-earth industry, their experience going back to the old "kieselguhr" days. Mr. Frankenhoff entered this field approximately 25 years ago. Mr. Gossman dates his beginning in 1915.

The Dicalite Company was organized in 1939, acquiring an extensive deposit of diatomaceous earth near Torrance, California, where the first plant began operation early in 1930. Since 1936, a second plant has also been producing from a large diatomaceous deposit near Terrebonne, Oregon. Today the organization is said to rank as the largest in existence devoted exclusively to the research, development and production of diatomaceous products.

E. W. Bauman Joins NCSA Staff as Field Engineer

E. W. Bauman

Edward W. Bauman has been made field engineer of the National Crushed Stone Association and will report for duty on November 15. Mr. Bauman attended Ohio Northern University from 1920 to 1923 when he interrupted his course in civil engineering, practically at its conclusion, to become a member of a survey party for the city of Los Angeles in connection with the Colorado River Aqueduct, a position which he held until 1924. He was then employed as junior materials engineer with the Illinois State Highway Department, specializing in materials testing and concrete research until 1926. He next accepted appointment as first assistant materials engineer with the Tennessee Highway Department and in 1929 he was promoted to engineer of materials and tests. From 1937 to 1941 he held the position of Highway Materials Engineer for the Republic Steel Corporation. In 1941 Mr. Bauman joined the Non-Metallics Section of the Mining Equipment Division of the War Production Board. Shortly thereafter he was promoted to Chief of the Section, the position, which he now holds.

Mr. Bauman's duties at present will be those properly included under his title of field engineer. He will spend a considerable amount of his time in the field, coöperating with engineers, contractors and crushed-stone producers.

New Standard Set Up for Mineral Wool

Commercial Standard CS105-43 for mineral wool, loose, granulated, or felted, for use in low-temperature installations is now available in printed form. It is designed to improve the quality of mineral wool and to set up installation requirements to be followed in insulating refrigerated compartments or cold areas.

This voluntary standard was proposed in April, 1942, by the Industrial Mineral Wool Institute. Following several preliminary meetings, a proposed commercial standard was prepared and submitted to manufacturers and to technical, distributor, and consumer organizations for their comments. The standard was then adjusted according to the composite recommendations of those concerned and circulated to the trade for written acceptance. It covers minimum physical and chemical requirements for mineral wool, as well as for auxiliary materials used in insulating cold areas. Detailed descriptions and diagrams are included in the pamphlet to illustrate the proper way to insulate various types of construction.

Printed copies of CS105-43 are obtainable from the Superintendent of Documents, Government Printing Office, Washington, D. C., at 5 cents each.

Earnings of Lone Star Decline But Slightly

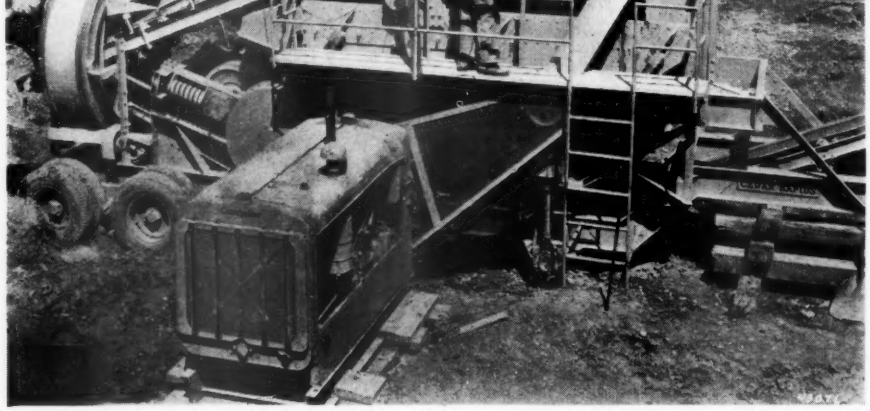
Net earnings of the Lone Star Cement Corporation for the quarter ending June 30 were approximately $600,000, equal to about 65 cents a common share. This would compare with $673,133 for the second quarter last year, or 71 cents a share.

Sales last year totaled nearly $35,000,000 and were the greatest in the history of the company. With the cement industry running at about four-fifths of capacity, the company reported net earnings of $681,369 for the March quarter this year or 72 cents a common share compared with $708,368, or 75 cents a common share in March, 1942, quarter.

Plant Conversions to War Goods Cuts Feldspar Demand

The conversion of many enamel and porcelain plants to heat-treating steel, to the manufacture of parts or assemblies for war machines or to other activities more closely allied to the successful conduct of the war sharply reduced the consumption of feldspar in these industries in 1942 the Bureau of Mines reports. Curtailment of plate glass production also tended to reduce feldspar sales. However, production and shipments of glass containers, which probably represent feldspar's most important consumer outlet, in 1942 were greater by 12 and 15 per cent., respectively, than in 1941, the former record year.

Sales of crude spar in 1942 totaled 307,823 long tons, valued at $1,516,791, a decrease of 9 per cent. in quantity and 0.2 per cent. in value from the 1941 level. Sales of ground spar in 1942 aggregated 327,786 short tons, worth $3,524,969, a decline of about 7 per cent. in quantity and value compared with 1941. The output of both crude and ground feldspar in 1942, however, was considerably higher than in any year other than 1941. The average value per ton of crude spar for 1942 rose 10 per cent., while the downyard trend in recent years in realization per ton of spar was checked, and a small increase recorded.



This Cedar Rapids portable crushing-and-screening plant, powered by a Caterpillar D13000 Diesel engine, is producing material for an air base in Kansas. In about six months the plant has produced 415,000 tons of stabilized base rock, concrete aggregates and sub-base materials.

WASHINGTON NEWS LETTER

another PQ AND exclusive

A GOOD DEAL of recent discussion on the post-war theme has turned on the difficulties inherent in reconversion from a war to a peace economy, with particular reference to the feasibility of repealing the war-instituted government controls over private industry. Both the legislative and executive branches of the government are coming under increasing pressure from business groups to lay the groundwork for an immediate relaxation of such controls at the war's end.

It is often difficult to make business understand that for the protection of its own interests, it is essential that the process of decontrol proceed very carefully and very selectively. The industrial history of this and other nations is replete with instances of business organizations exerting certain economic pressures which, while appearing to have a near-term advantage, have actually reacted to their own later detriment and to that of the economy as a whole.

This lesson for post-war planning is pointed up in a report recently issued by the Department of Commerce dealing with the necessity of avoiding the dangers which post-war inflation would hold for the success of the reconversion process. Everyone will agree that full or near-full employment after the war will require a larger volume of productive activity on the part of most individual business units than has ever been experienced in peace time. Perhaps the most favorable influence affecting such an expansion will be the tremendous potential market for goods, as represented by the huge amount of liquid assets accumulating in the hands of individuals as a result of wartime savings.

Annual savings of individuals never exceeded $10,000,000,000 prior to 1941, whereas in 1943 they will go over $35,000,000,000. For the four-year period 1941-1944 (assuming that the war continues through next year) total individual savings will have increased by some $120,000,000,000, roughly $90,000,000,000 of which will be in the highly-liquid form of currency, bank deposits, or government bonds. This constitutes the minimum reservoir of individual purchasing power which will be available to finance the post-war reconversion, and to this must be added the purchasing power represented by current earnings of income after the war.

At first glance it might appear that it is to the drawing down of these reserves that we must look to provide the market for post-war civilian production. Actually a high level of production in the post-war years may be attained without the expenditure of these savings; furthermore, the

Buy Another War Bond

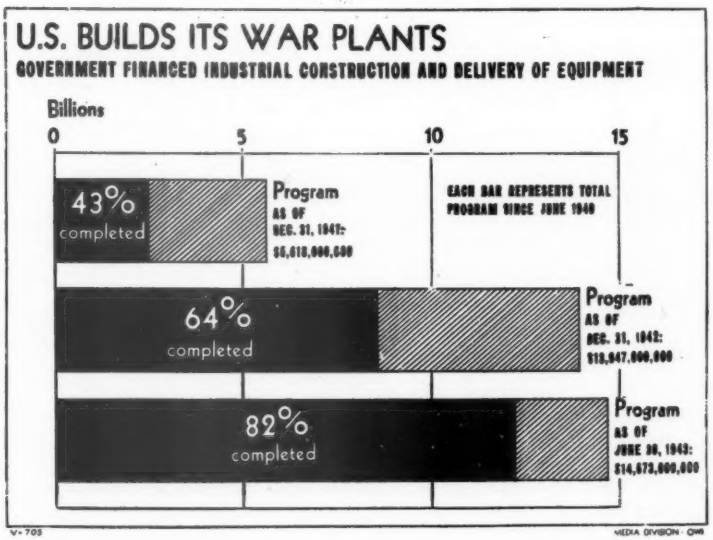
magnitude of the reserves is so great that there is a real danger that, following a temporary "boom" they may impede business expansion rather than encourage it.

The explanation of this paradox lies in the fact that the spending decisions or, to put it more broadly, the "income administration" of consumers depends largely upon their attitude toward the adequacy of their savings as a protection against future contingencies, and upon their anticipation as to future earnings. While directly affecting the spending of current income, accumulated savings are not a substitute for such income, for the average consumer will not be inclined to dip very deep into his savings unless he is fairly sure of the continuance of his income.

Thus, a high level of savings serves as a primary psychological influence affecting the spending decisions of the consuming public and, for this reason, the production decisions of industry. High savings will tend to make the average consumer spend a greater portion of his post-war income than he otherwise would. In the resultant cycle producers, finding a ready market for their products and recognizing the favorable potentialities of the purchasing-power reserves in the hands of the public, are more ready to expand their output in order to supply the market. Expanded production means expanded employment, which in turn means expanded wages and other income payments; these provide the wherewithal to consume the goods flowing from the factories.

If, however, the pressure of wartime savings is so great as to create a demand for considerably more goods than are available in the reconversion period, a frantic buying wave may result, with its attendant serious inflation. Such an inflation would dissipate the favorable influence of accumulated reserves on post-war activity, for by reducing the purchasing power of these reserves, their adequacy as a protection against the future need of consumers is diminished. Spending decisions would be adversely affected, and in turn would exert a depressing effect upon production and, therefore, employment and income payments.

Thus, the very same accumulated reserves may result in two entirely disparate situations, one desirable, the other reminiscent of former unhappy days. In the absence of all government control there is no assurance that events will take the one path or the other. Promotion of the all-important ability and willingness of consumers to spend rather than save current income, through speeding the transition to civilian production, controlling inflation, and inspiring and maintaining public confidence in the future will all be recognized as essential public functions.



the VICTORY *Program*

. . . . . AND YOUR BUSINESS

ABRASIVE INDUSTRY COMMITTEE.— The War Production Board has announced the formation of the Coated Abrasive Industry Advisory Committee composed of the government presiding officer. Franz T. Stone, and these committee members; George Balcom, Abrasive Products, Inc., South Braintree, Mass.; James Jackson, Mid-West Abrasive Co., Detroit; A. G. Bush, Minnesota Mining & Mfg. Co., St. Paul; Charles Knupfer, Carbonundum Co., Niagara Falls, N. Y.; H. M. Elliot, Behr-Manning Corp., Troy, N. Y.; George Manning, Armour & Co., Chicago; E. B. Gallaher, Clover Mfg. Co., Norwalk, Conn.; Austin M. Porter, Wilmington Abrasive Works, Inc., Wilmington, Dela.

BALL-MILL LINERS.— When the Mining Division issued its last revision of the Definition of Quota Items, ball-mill liners were listed as a controlled material, notwithstanding the fact that fabrication is involved. Producers viewing ball-mill liners as covered by their dollar-value quotas would have proceeded differently in applying for controlled materials if there had been advance knowledge of this new concept. As they were, therefore, placed at a seeming disadvantage, the Mining Division had the following to say in a letter to a producing company with reference to this matter:

"Generally speaking, ball-mill liners are a controlled material and for this reason have been placed in the controlled-material section of your quota application. However, there are instances where liners differ widely from the general type and are definitely a fabricated item.

"We are of the opinion that the linings as described by you are definitely fabricated, and as a consequence they should be listed under your dollar-value quota for repair and maintenance. This being the case, we assume that you will not require supplemental quota."

CONSTRUCTION EQUIPMENT PARTS.— An urgent appeal to manufacturers of constructing equipment to increase their production of repair and spare parts was issued October 13 by the War Production Board's Construction Machinery Division. The present output of parts is at the rate of 50 per cent. of the total dollar value of the equipment produced, while the peace-time output of parts was at the rate of 15 per cent. of total production by dollar value. Despite this increase, not enough parts are being produced to meet the present requirements and the 1944 demand is expected to be even higher. Most urgently needed are parts for power shovels and cranes.

The abnormally high demand for parts is due to several factors:

Approximately 95 per cent. of new cranes and shovels are used for military work overseas and at home. These items are shipped overseas with spare parts to the amount of 25 per cent. or more of their total value to provide for adequate maintenance.

At home, where only 5 per cent. of new cranes and shovels and only about 10 per cent. of all new construction machinery are available for civilian purposes, a large amount of second-hand equipment has been pressed into service with a resultant increase in the need for maintenance parts. Moreover, the equipment at home is being operated 18 to 20 hours daily instead of the normal 8 to 10 hours, and an added factor in the increased demand for repair parts is the lack of experienced operators, many of whom are now in the Armed Services.

In an effort to increase the production of parts, the construction machinery industry is using subcontracting to an ever greater extent. Available facilities of the machine-tool industry are being used in particular. The output of heavy spare parts, machined from castings, is hampered by manpower shortages in steel foundries.

GRAPHITE AND BAUXITE.— The War Production Board on October 27 issued a statement reviewing the board's action restricting marginal mineral production. The board has acted because of three changed factors in the mineral-production program, these being increased mineral production, revised military requirements and a greater need for marginal manpower than for marginal minerals.

The following actions among others, have been taken:

Contracts with the larger domestic graphite companies are to be canceled; the mines of these companies are to be held in a state of readiness for the duration of the war and no more graphite is to be stocked by them.

The production of bauxite in Arkansas by the three major producers is being sharply cut.

These administrative actions have been called for by the need to direct national effort to attain maximum over-all output in an all-out war. The Mineral Resources Operating Committee is periodically reveiwing each mineral to determine the supply rate that should be planned in order to meet requirements and stock-pile objectives. Administrative action will be taken from time to time on specific cases to meet these objectives and in keeping with the basic minerals and manpower policies established by the Congress and the President, and the directives issued by the Chairman and the Executive Vice-Chairman of the War Production Board.

LIME INDUSTRY ADVISORY COMMITTEE.— Thirteen representatives of the quicklime and hydrated lime industry were appointed by the Office of Price Administration October 4 to a Lime Industry Advisory Committee, to coöperate with OPA in examining price control needs in their field. The industry includes about 160 companies, which in 1942 produced approximately $42,000,000 worth of the two varieties of lime. This included five types of quicklime and three types of hydrated lime. Agricultural lime is not affected by the action.

Among those who consume quicklime and hydrated lime are producers of iron and steel, copper, glass, sugar, leather, calcium carbide, aluminum, paper and water purifiers. Prices for the lime are controlled under Maximum Price Regulation 188, Manufacturers' Maximum Prices for Specified Building Materials and Consumers' Goods Other than Apparel.

Those named to the industry advisory committee represent all classes of producers. They are: H. D. Brigstocke, Thomasville Stone & Lime Co., Thomasville, Pa.; Reed C. Bye, Warner Co., Philadelphia; Ralph Dickey, Kelley Island Lime & Transport Co., Cleveland; John Durrell, Hoosac Valley Lime Co., Adams, Mass.; John A. Kirk, Jr., Standard Lime & Stone Co., Baltimore; Warren Lewis, Longview Saginaw Lime Co., Birmingham, Ala.; H. P. Mathews, Mississippi Lime Co., Alton, Ill.; B. L. McNulty, Marblehead Lime Co., Chicago, Ill.; Amos B. Miner, National Gypsum Co., Buffalo, N. Y.; Frank Sadler, United States Gypsum Co., Chicago, Ill.; Wilfred W. Sprague, National Mortar and Supply Co., Pittsburgh, Pa.; R. E. Tremoureaux, United States Lime Productions Corp., San Francisco, Calif., and E. I. Williams, Riverton Lime and Stone Co., Riverton, Pa.

LIME LOADING REQUIREMENTS.— On October 23 the Office of Defense Transportation issued Special Direction ODT 18A-1 to cover the loading requirements of a series of commodities including lime and limestone. This order became effective November 1 and takes the place of Special Permits 3000 to 3000AV that have been granted to lime manufacturers during the past two months to allow the shipment of lime in containers when loaded to a minimum of 60,000 pounds.

Notwithstanding the provisions of Section 500.72 of General Order ODT 18A, on and after November 1, 1943 any person may offer for transportation, and any railway carrier may accept for transportation at the point of origin, or forward therefrom, carload shipments of lime and limestone as follows:

Lime.—(a) In packages, shall be loaded to a weight not less than 60,000 pounds.

(b) In bulk, in closed freight cars, shall be loaded to a weight not less than 80,000 pounds.

Limestone.—Ground or pulverized, in packages, shall be loaded to a weight not less than 80,000 pounds.

LUMBER.— The recent revision of the Softwood Lumber Order, M-208, effects an important change in the mining industry's procedures with reference to lumber procurement. Heretofore producers have had an AA-3 rating under M-208, but with a definite ceiling on lumber purchases under Item 46 in the quota authorizations. Whenever the AA-3 was inadequate, producers were permitted to use the AA-1 rating but deducted, in that event, the value thereof from their quotas for fabricated repair parts and operating supplies. Under M-208 as amended, beginning with the fourth quarter of 1943, producers should use an AA-1 rating for *all* lumber requirements, the extent of such lumber purchases being governed by the specific allowance received by producers in Item 46 for the fourth quarter. The AA-3 rating is no longer applicable for lumber for repair and maintenance work. When the AA-1 rating for lumber is used in accordance with these instructions, the value thereof should *not* be deducted from the dollar-value quota in Item 53. In the fourth-quarter Item 53 allowances made in the dollar-value quota

do not cover any portion of producers' lumber needs. All lumber requirements for maintenance, repair and operating supplies should be included in Item 46.

However, whenever lumber is required for *new* construction, producers continue to have an AA-3 rating, the M-208 Order as amended containing the provision that this rating is applicable to lumber for "Building, structures and equipment for the efficient and safe operation of facilities directly connected with the discovery, development, depletion, smelting, or refining of mineral deposits, other than gold and silver." The Construction Conservation Order, L-41, exempts from the construction restrictions "A structure or project which is to be used directly in the discovery, development or depletion of mineral deposits."

The M-208 Order covers "Softwood lumber." This is defined to mean "any sawed lumber (including shingles and lath) of any size or grade, whether rough, dressed on one or more sides or edges, dressed and matched, shiplapped, worked to pattern, or grooved for splines, of any species of softwood."

Douglas fir lumber is covered by another order, L-218. Producers needing Douglas fir lumber must use other procedures. Douglas fir lumber is defined to mean "any sawed lumber (except shingles or lath) of any size or grade, whether rough, dressed on one or more sides or edges, dressed and matched, shiplapped, worked to pattern, or grooved for splines, of the species of Pseudotsuga taxifolia, produced in those parts of Oregon and Washington lying west of the crest of the Cascade Mountain Range, but not including No. 3 boards, No. 3 dimension, or No. 3 timbers, or any grade of factory or shop lumber, and not including plywood, veneer or used lumber."

MINERAL WOOL PRICES.—Manufacturers of mineral-wool insulation, including building and industrial products made from mineral wool were permitted by the Office of Price Administration on September 1 to use the special "national or general shortage" provisions for the adjustment of maximum prices which have been made available by OPA to producers of two other types of building materials.

Specifically, the action permits mineral-wool-insulation producers to use the adjustment provisions contained in Order A-2 of Maximum Price Regulation 188 (Manufacturers Maximum Prices for Specified Building Materials and Consumer Goods other than Apparel). The provisions previously were made available to manufacturers of lime and ladle brick.

The new provisions permit the granting of relief to cover total manufacturing costs to (1) manufacturers who are unable to maintain or expand production under existing maximum prices wherever there is a general shortage and the production of each producer is needed, or (2) where the loss of the seller's production would result in higher consumer prices.

Other adjustment provisions of Regulation 188 apply to local shortages of essential materials, to sole maufacturers of an essential commodity, and to manufacturers operating under government contracts and subcontracts.

The action, contained in Amendment 3 to Order A-2 of Regulation 188, will not affect prices at consumer levels since distributing levels are not given permission to pass on the increased cost.

The amendment, which became effective September 16, 1943, was necessary to assure consumers of an adequate supply of mineral wool insulation. The construction of living quarters for war workers and other building operations has created a demand out of proportion to available supplies of the materials.

In determining the amount of relief to be granted, OPA will consider the following factors: revenue from sales of the mineral wool insulation and products and revenue from all other sources; costs relating to production, mining, quarrying, development, processing and transportation; expenses relating to administration and sales; depreciation and depletion charges, and taxes and capital investment.

To assist manufacturers, applicants for adjustment may obtain from OPA advice as to the specific information that will be required in order that applications may receive prompt attention.

MINERALS ORDER AMENDED.—The War Production Board on October 11 issued Amendment 1 to General Inventory Order M-161 as amended September 29, 1943, pertaining to miscellaneous minerals and other products. Under the amendment, exceptions from restrictions of CMP-5 and CMP-5A are granted for materials on List A ordered for maintenance, repair or operating supplies. Any person may receive or order for delivery any quantity of listed material without restriction and without charging such material to his base-period quota except to the extent that purchases of the same material were taken into account in arriving at his quota.

TRUCK AND TRAILER PARTS.—A serious shortage of certain truck replacement parts has made necessary the uprating of preference orders from AA-2X to AA-1 for production and distribution of these items, the War Production Board announced October 11.

The production and distribution of replacement parts for medium and heavy trucks, truck-trailers, passenger carriers, off-the highway motor vehicles and motorized fire equipment must be handled in the last quarter of 1943 and the first quarter of 1944, as though orders therefore bore a preference rating of AA-1, according to the provisions of an amendment to Limitation Order L-158, effective October 11. Replacement parts for passenger automobiles and light trucks must continue to be produced and shipped as though orders therefore bore a preference rating of AA-2X. This amendment is designed to make available a sufficient quantity of essential parts to maintain vital motorized transport.

PART 3286—MISCELLANEOUS MINERALS[1]

[General Inventory Order M-161 as Amended October 11, 1943]

INVENTORY RESTRICTION EXCEPTIONS

Section 3286.76[1] *General Inventory Order M-161* is hereby amended to read as follows:

§ 3286.76[1] *General Inventory Order M-161*

—(a) *What this order does.* This order excepts certain materials from inventory restrictions and from limits on the purchase of maintenance, repair, and operating supplies. The exception is made in some cases because there is no serious shortage of the material and in other cases because the material is available in quantity only in certain seasons, so that it is desirable to permit persons to buy and store it without limit.

(b) *Exception to inventory restrictions.* Section 944.14 of Priorities Regulation 1, which restricts inventory to a practicable working minimum, does not apply to the materials listed on Schedule A. Each of these materials is also exempted from all inventory restrictions in any other regulation or order of the War Production Board unless they expressly mention the material.

(c) *Exemption from restrictions on maintenance, repair, and operating supplies.* The materials listed on Schedule A are not subject to any restrictions in any regulation or order of the War Production Board which limit the quantity of material received or ordered for maintenance, repair, or operating supplies during any period on the basis of the amount of such supplies purchased during a base period. A person may receive or order for delivery any quantity of listed materials without regard to these restrictions. He does not have to charge his orders for any such material against his base-period quota except to the extent that purchases of the same material were taken into account in arriving at his quota. For example, a manufacturer operating under CMP Regulation 5 is limited in his purchases of maintenance, repair, and operating supplies to the amount which he spent in the base period. A manufacturer who spent $50,000 during the base period, including $500 for lead, may buy any amount of lead during the current period, and may use his MRO rating for that purpose, and he need include only $500 of the amount thus spent for lead in figuring the amount to be charged to his quota of MRO.

Issued this 11th day of October 1943.

WAR PRODUCTION BOARD,
By J. JOSEPH WHELAN,
Recording Secretary.

SCHEDULE A

Bentonite.
Kaolin.
Ball clay.
Stoneware clay.
Feldspar.
Potter's flint.
Domestic andalusite.
Domestic dumortierite.
Pinite.
Pyrophyllite.
Soapstone.
Ilmenite.
Salt (sodium chloride) in bulk.
Sodium sulfate (salt cake).
Borax (hydrated and dehydrated).
Boric acid.
Lead.
Phosphate rock.
Sulphur.
Waste paper.

[1]Formerly Part 1255, § 1255.1.

• New Lubrication Firm

The Lubrication Engineering Company, with offices in the Pure Oil Building, Chicago, is a new organization comprised of technical engineers and lubrication experts with the sole purpose in mind of providing an authentic source of accurate information on lubrication in the construction, mining and industrial fields, furnishing accurate lubrication engineering reports and developing lubrication programs, charts, diagrams and other technical information required. The company is headed by W. J. Cullen.

• Acquires Stokes Rubber

The Thermoid Company has announced acquisition of the Joseph Stokes Rubber Company. With the acquisition Thermoid's combined sales for the year 1943 should exceed $19,000,000, making it one of the largest rubber companies in the East.

• Buys Another Plant

The General Refractories Company is operating the plant previously owned by the Refractories Corporation of Los Angeles which it purchased last May. The plant is served by the Los Angeles Junction Railway.

NATIONAL GYPSUM'S POST-WAR PLANS

another P and Q exclusive

By W. L. JURDEN
Director of Post-War Planning,
National Gypsum Company

●

DURING the past year considerable thought and effort has been given to the subject of post-war planning. In a good many cases, however, the planning has been in the realm of disjointed and haphazard thinking, without consideration for the concrete execution of the plans.

Industry's first job is an all-out effort towards winning the war as quickly as possible. Individual industries must also devote their efforts towards maintaining a solvent position during the war, in order to emerge in the post-war period on a sound financial and economic basis. Because of these efforts, many managements find it difficult to devote any of their time and talent to post-war planning. It is a wise move, therefore, to take one man from the organization and let him devote his entire time to post-war planning, while the remainder of the organization devotes its time to current operations.

There are many phases of post-war planning, but we are primarily interested in this article with the possibilities of giving practical effect to theories of planning, for release after the war. We will narrow this field further by dwelling on the production aspects of this problem.

The production phase of post-war planning deals with the development of new products, improving the quality of present standard products, and improvements of production facilities for increased economies and to take advantage of technological developments as a result of the war.

After a series of meetings and reports from key employees the management of the National Gypsum Company determined what new products would be of interest after the war to fill out its present line of products, which products required quality improvement, and which plant operations were obsolete. With this list of problems, the Director of Post-War Planning then set up a program to determine the qualities desired in the new products, the quantities required, and the production facilities needed.

The desired qualities of the new product were obtained from a survey of the ultimate consumer, from the jobber and dealer, and from a study of competitive products on the market.

The desired quantities of the new product were obtained from a sales department survey, coupled with a study of potential post-war markets.

The production facilities required present the biggest problem, if the new products are entirely foreign to the operating department.

An illustration of the steps taken by the National Gypsum Company on one such product will illustrate the problems involved. Assuming that the qualities and quantities of product *X* have been determined, the first step involves an exhaustive research into the various methods of producing it. Company policy demands that the product be produced at less cost than the best now produced by competition, or that the product shall have qualities superior to those of the best competitive product but with production costs equal to those of competition.

It is not always easy to go to a competitor to discuss his manufacturing methods and manufacturing costs, so that other means must be devised. There are many ways to obtain the necessary preliminary information, and we found outside research laboratories, both profit and non-profit, to be very helpful. Also, we used the facilities offered by university laboratories and government testing stations. Discussions with technical experts of concerns manufacturing equipment to be used in producing item *X* yielded a wealth of information. At this time there are also local and national committees set up to aid manufacturers in their post-war planning, and many state divisions of commerce are now organized with experts available who can be very helpful.

After exhausting all the possible sources of information outlined above, the facilities of our own research laboratories were utilized to check the information and carry out further development.

At this point our ideas as to the best methods for producing item *X* were fairly well crystallized, and our next step then involved our patent attorneys. An exhaustive study was made by them and an opinion rendered as to any possible patent infringements that might arise from using the production methods outlined.

After we had determined that there would be no restrictions requiring license agreements or the purchase of patents, we called in a manufacturing concern who had both designing engineers and manufacturing facilities available. It had been decided that a pilot plant

(*Continued on Page* 117)

W. L. Jurden

● Appointment of W. L. Jurden, as Director of Post-War Planning for the National Gypsum Company was announced recently by Melvin H. Baker, president. Mr. Jurden, who has been production manager for four of the company's chain of 21 plants, is being transferred to the administrative staff from the production department.

In making the announcement of Mr. Jurden's appointment, Mr. Baker said:

"Our first job is to make victory quick and final. But in doing this we should look ahead and plan for the market after the war. Rehousing America then will be a tremenous job, and it will have a far reaching and stimulating influence on all business.

"Our research laboratories have developed many new products for wartime construction that are expected to find an important market after the war. It will smooth the post-war path to prepare for these markets now."

Mr. Jurden, a graduate of Lehigh University in mechanical engineering in 1933, came with the National Gypsum Company in 1938 to assist Gordon H. Tarbell, Vice President in charge of production. Mr. Jurden assumes his new post as Director of Post-War Planning after a year and a half as Production Manager.

Virginia Operator's 3-Dredge Set-Up Produces Gravel for Vital War Jobs

another ON THE SPOT report

ONE of the most interesting sand-and-gravel dredging operations the writer has yet encountered is that of the Southern Materials Corporation of Virginia. Since 1938 the corporation has substantially expanded its facilities. Now its plants can produce in excess of 10,000 tons of sand and gravel daily for construction projects in Richmond, Norfolk, Newport News and the surrounding area. Two large dredges produce this material, and a floating recrushing, rewashing and rescreening plant supplements them when needed.

The corporation is owned and operated by the same men who formerly owned the Capitol Materials Corporation of Washington, D. C. Until it was sold early in 1938, this corporation was one of the important producers of sand and gravel and ready-mixed concrete in that area. The Southern Materials Corporation, with headquarters in Norfolk, Virginia, was incorporated in September, 1938, and immediately the production of aggregates and concrete was begun. The ready-mixed concrete operations have also been greatly expanded and the company now operates yards at Norfolk, Richmond, Portsmouth and Hampton from which one of the South's largest fleets of mixer trucks is operated. Chain-Belt Rex and Smith truck-mixers are used exclusively.

The dredge *Capitol,* which was brought from Washington, was built in 1931. It had a 32- by 115-foot wooden hull, a 10-inch pump and a 50-foot suction ladder. Later a 12-inch pump was installed but this was replaced by a 14-inch pump in 1938, when the dredge was moved to its new location. The length of the ladder was then extended to 56 feet. A crusher, vibrating screens, sand-settling tanks and other equipment were then installed to make this dredge a complete floating sand-and-gravel plant. At that time it was known as Dredge No. 1 and is now called Dredge No. 4.

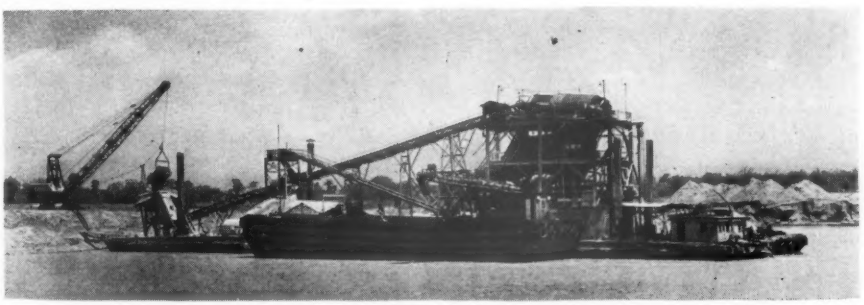
Early in 1940 the rewashing dredge, No. 2, was built and late in that year a steam dipper dredge was added and was used for about a year. In March, 1941 the new Dredge No. 9 was put in operation and this is now the main producing unit.

Beginning in August, 1938, a pond was cut into the east bank of the James River downstream from Richmond. This pond has now been expanded to cover an area of 45 acres and is growing rapidly. The deposit is being excavated to a depth of 40 to 55 feet and good material is known to extend to much greater depths.

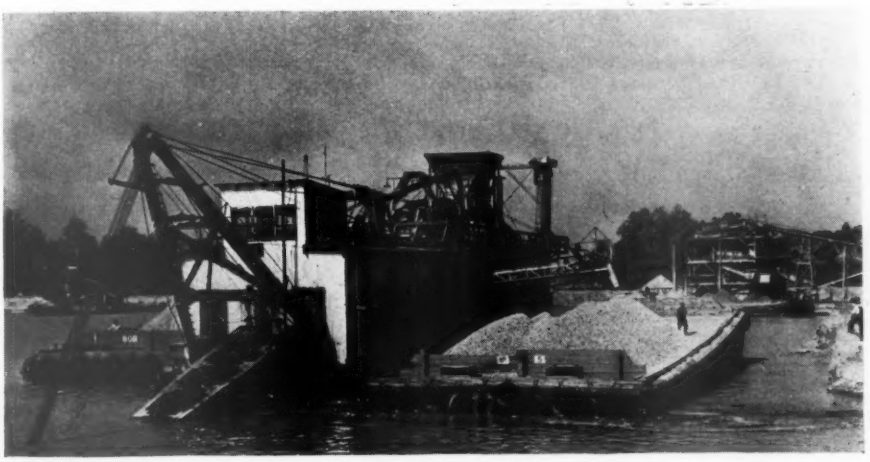
The removal of overburden from this deposit has always been a problem which now appears to have been solved. The overburden is a combination of sticky mud, river loam, blue and red clay, and sand and is from 3 to 5 feet in depth. Originally scrapers were used, but the job was too hard for them alone. In March, 1941, a Northwest 3-cubic yard dragline was purchased to work with the scrapers. This arrangement worked well but, as the output of sand and gravel was increased, more digging capacity was needed. In October, 1941, two Le Tourneau 12-cubic yard Model C Tournapulls were purchased to aid the dragline. These were so satisfactory that two more were bought in January, 1942. The four Tournapulls have averaged six trips per hour each with an average one-way haul of 600 feet. A Caterpillar D8 tractor with a Le Tourneau Angledozer is used to level off the overburden at the dump and for clean-up work.

By W. E. TRAUFFER

The company's largest dredge, No. 9, is actually not a dredge but a floating crushing-and-screening plant 260 feet long and 38 feet wide. Material is fed to it by a Marion Model 40A dragline which has a 90-foot boom and is driven by a Cummins 260-horsepower Model L Diesel engine. It operates a 5-cubic yard DeSoto Foundry, Inc. Hendrix lightweight dragline bucket with perforated sides which let much of the water drain out. The dragline works out as much of the bank as possible



Dredge No. 9 showing feed from drag-line and barges being loaded.

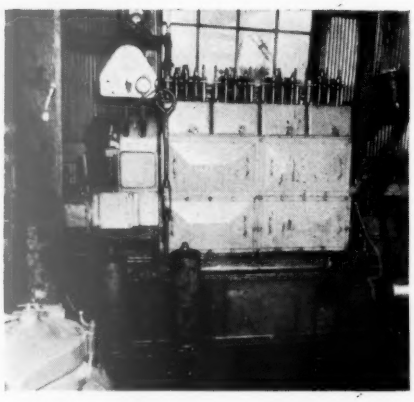


Dredge No. 4 in foreground, No. 9 at the right and No. 2 in distance at the left.

with the dredge in one location before it is moved. It can excavate material to a depth of 60 feet and discharges it over a 10-inch sloping bar grizzly into a 30-cubic yard hopper on the dredge. A 42-inch by 180-foot inclined belt-conveyor carries the material to two 84-inch by 30-foot Kennedy-Van Saun revolving screens which are equipped with outer jackets. The plus-2-inch gravel is discharged into a Kennedy-Van Saun No. 49 gyratory crusher set at 2-inch opening. A 24-inch by 100-foot belt-conveyor feeds the crushed gravel back to the main conveyor.

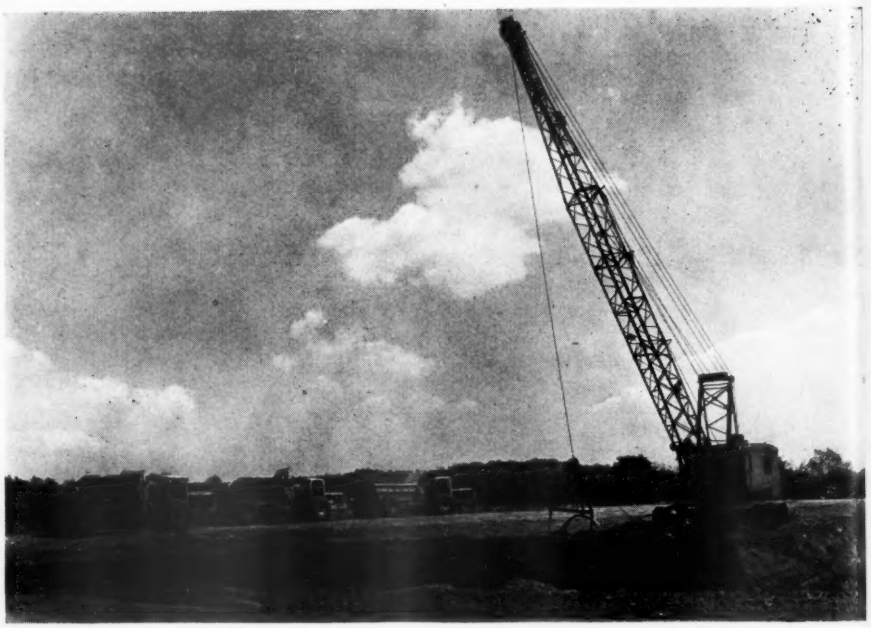
The sand passing through the outer jacket of this screen is flumed to a pair of 5- by 27-foot sand-drags by which it is discharged direct into barges on one side of the dredge. This plant has been operating from 16 to 20 hours daily with an output of 400 tons per hour.

The 260-horsepower Diesel engine on Dredge No. 4 drives the crusher and other equipment.



This 150-horsepower Diesel on Dredge No. 4 drives hoist operating shore lines and spuds.

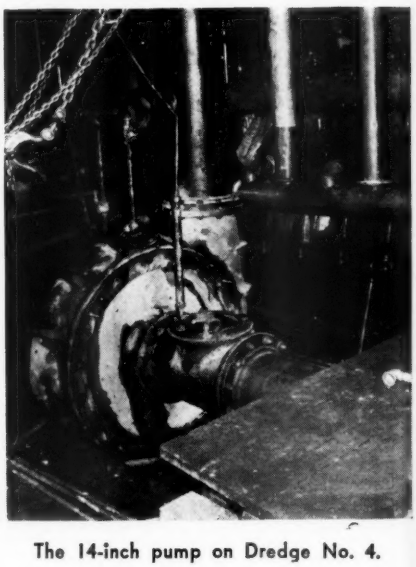
The entire plant is driven by four Diesel engines, three of which are Murphy M E 6 150-horsepower units. One of the Murphy machines drives the 10-inch wash-water pump. Another drives a service-water pump, the spud hoist, and a generator which supplies current for the electric motors driving the screens and other equipment. The third drives a shaft from which are driven the crusher and a generator which supplies current for the sand-drag motors. The crusher is driven through a D. O. James speed-reducer and V-belts from the shaft. A Caterpillar Diesel engine drives another generator which supplies current for lights, the conveyor motors, etc. A Westinghouse welding generator is also connected to this engine. The generators on this dredge are hooked up in such a way that the power load for any of the motors can be transferred from one to another in case an engine is shut down.



Diesel drag-line and wagons used in stripping.

This dredge was designed by the Kennedy-Van Saun Manufacturing & Engineering Corporation, which also supplied all the crushers, screens, conveyors, etc. Cincinnati conveyor belting and V-belts and some Manheim Velos built-up V-belt drives are used. The screens are driven through D. O. James speed reducers and are equipped with Hendrick perforated plate. In cold weather material on the belt-conveyors is kept from freezing by jets for which steam is supplied by a 60-horsepower boiler. The dredge is anchored by means of three 20-inch square 70-foot spuds, two at the stern and one forward.

Dredge No. 4 has a 48-foot Hetherington & Berner steel ladder with a 14-inch suction line and a 5-blade Amsco rotary cutter-head. The 14-inch George Iron Works centrifugal dredge pump discharges through a 14-inch pipe into a flood-box, from which much of the water overflows to waste. From the flood-box the material goes to a 60-inch by 28-foot Telsmith Ajax revolving screen which is equipped with a sand jacket.



The 14-inch pump on Dredge No. 4.

The oversize gravel, plus-1½-inch, goes to a Kennedy-Van Saun No. 49 gyratory crusher from which the crushed gravel is returned to the screen by a series of two 24-inch belt conveyors, one 80 and the other 50 feet long.

The sand passing through the outer jacket goes through a series of seven settling tanks and a 5- by 27-foot and sand-drag from which it is discharged into barges. The 1½-inch gravel is loaded by a 24-inch by 30-foot belt conveyor into a barge on the opposite side of the dredge. This dredge produces about 3,000 tons of sand and gravel in a 20-hour day.

All the equipment on this dredge is driven by three Diesel engines. A Superior UDMB 260-horsepower unit drives the 14-inch dredge pump through V-belts and also drives a generator for lights and small motors. A 100-horsepower Superior engine

Perforated 5-cubic yard drag-line bucket loaded with gravel for Dredge No. 9.

drives the 5-drum Hetherington & Berner hoist which operates the A-frame, the shorelines and the two spuds. A Cummins 260-horsepower Model L Diesel engine drives the crusher through a James speed-reducer and V-belts as well as the sand-drag and a generator for the conveyor motors.

The revolving screen on this dredge is equipped with Hendrick perforated plate on the main barrel and Tyler wire cloth on the sand jacket. Cincinnati conveyor belting, Velos drive belts and Manhattan suction hose are used.

Dredge No. 2 is used for reprocessing material from the other two dredges when necessary. It is principally used to mix two or more sizes of gravel from the other dredges to meet special requirements. The use of this floating plant in conjunction with the two dredges gives the entire operation a flexibility of production equal to that of any short plant.

A Model 6 Northwest crane on this dredge unloads the materials to be reprocessed from barges to a hopper. This crane has a 50-foot boom and a 1½-cubic yard Owen clamshell bucket and is powered by a Murphy Diesel engine. A Robins Gyrex 2-deck vibrating screen diverts the oversize gravel to a Kennedy-Van Saun No. 37 gearless gyratory crusher. A series of two 18-inch by 45-foot belt-conveyors feeds the crushed gravel back to the screen. The other two sizes made by this screen go to a Telsmith Pulsator screen for final sizing. A 24-inch by 24-foot boom conveyor discharges the coarse product of this screen into a barge on one side of the dredge. An 18-inch by 45-foot conveyor loads the fine gravel into a barge on the other side. A Caterpillar 160-horsepower D 17,000 Diesel engine furnishes all the power for this plant. It drives the wash-water pump, a generator for the conveyor and other motors and the two spuds. Cincinnati conveyor belts and Velos drive belts are used on this dredge.

A Model 4 Northwest Diesel crane with a 60-foot boom mounted on still another barge is used for general utility work about the dredges and at other points. It is used principally for general maintenance and marine service.

All the material produced is hauled away on barges to various river and shore points. Most of it goes direct to the company's aggregate-storage and ready-mixed-concrete yards or to large construction projects. A large percentage of the output is transhipped by railway to inland points. Marine deliveries are made by a fleet of 70 company-owned barges having an average capacity of 600 tons each. Four of the fleet of company-owned Diesel-powered tugs are used to haul these barges to Richmond and for servicing the dredges at the deposit. The longer hauling to the Norfolk area and to shore points is done by six much larger tugs. These haul from 5 to 7 barges or lighters per trip, and make the round trip in 48 hours.

Diesel engines are used exclusively in the company's operations because of their dependability and economy. Gulf lubricating oils are used in the Murphy, Superior and Cummins engines. Standard Oil Company of California R.P.M. oil is used in the Caterpillar engines.

On shore a very complete machine and repair shop is maintained, powered by a Caterpillar D8800 Diesel engine.

Crusher which reduces oversize from screen on Dredge No. 4.

Drag-line loading main conveyor to Dredge No. 9. Return conveyor from crusher at left.

The 5- by 27-foot sand drag which dewaters sand going from Dredge No. 4 to barges.

GETTING LONGER LIFE FROM BRAKE AND CLUTCH LININGS

Part II—Selection, Application and Repairs

By SPENCER JONES

another P AND Q exclusive

SINCE coefficient of friction has been mentioned several times in this article, it might be of interest to define it scientifically . . . with some brief practical comment. Coefficient of friction is the ratio between the tangential frictional force between two contact surfaces and the perpendicular force pressing them together. It is called *static* coefficient of friction if the surfaces *are not* moving with respect to each other, and *kinetic* coefficient of friction if they *are* moving with respect to each other.

Irreverent rule-of-thumbers sometimes wonder how there can be any such thing as static coefficient of friction, or how there can be any coefficient of friction at all without relative motion of parts rubbing against each other. Fortunately static coefficient of friction is a sort of scientific "double talk" which it is not necessary for practical folks to worry about.

So far as kinetic coefficient of friction is concerned, there seems to be an idea that this is constant and unvariable. It is not! Kinetic coefficient of friction, which is the kind referred to when friction materials are being described, is a constant only when all other factors, such as rubbing speeds and temperatures and pressures are constant . . . and there are not many cases of this sort. That is why it is often such a help to get the "feel" of a clutch or brake when operating.

The point of this comment is that, in dealing with friction materials, there is no adequate substitute for experience, common sense and practical experiments until such time as the scientists catch up with what actually happens when a brake or clutch is used.

Since heat is produced by all brakes and clutches, and since it seems practically impossible to prevent a certain amount of excessive heat from being generated, at least momentarily, two of the important functions of the maintenance man, as well as of the operator, are (1) to permit the heat of friction to be dissipated rapidly, and (2) to provide means of rapid heat dissipation.

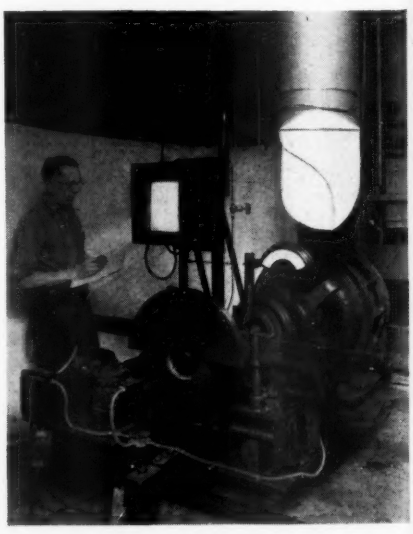
The operator can do his part by allowing a free circulation of air around the brakes and clutches, and by refraining from housing them or otherwise covering them in such a way as to prevent free air circulation around them.

The maintenance man can see that the equipment is provided with ample ventilation—in some cases with air-blowing arrangements—to dissipate frictional heat.

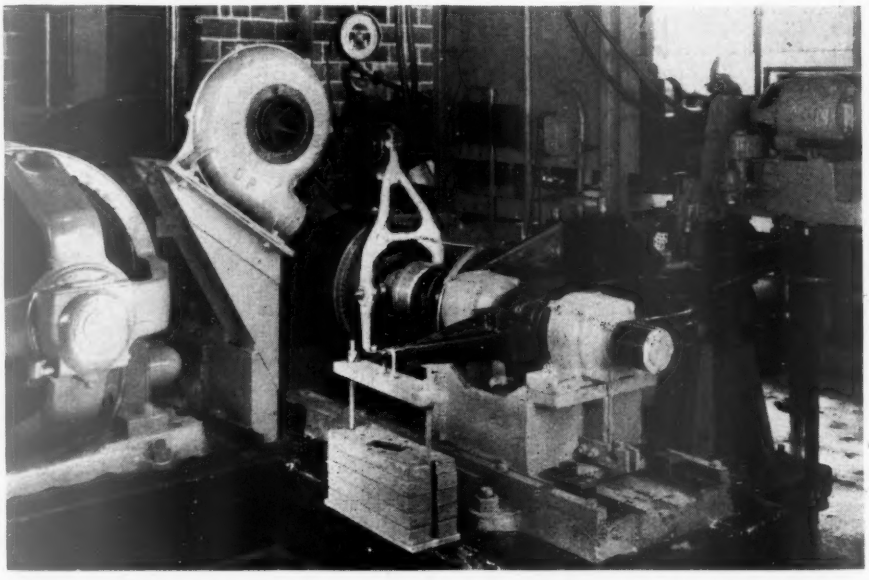
It is in the dissipation of heat that some designers of brake and clutches appear most frequently to lack interest. Brakes and clutches that are used continuously often represent more of a problem of heat dissipation than of mechanical design. The trouble is that the heat of the entire mechanism increases as friction continues until the rate of heat generation and dissipation balances at the rubbing surfaces. If the temperature at this balance point is too high the friction material is destroyed more or less rapidly.

Possibly if brakes and clutches were never used in excess of their rated capacity this problem of heat dissipation would not be of great importance. But the trouble is that equipment is almost always overloaded to some extent, even if only for short periods of time. While the mechanism is capable of handling these excess loads, so far as strength and torque transmission are concerned, the dissipation of the excess heat thus generated is not always adequately provided for. The best factor of safety for friction materials is to provide means of getting rid of frictional heat fast.

Mechanisms which rotate continuously and at high speeds, such as clutches, are easier to provide with means of heat dissipation than are slower moving devices, such as band brakes. Although radiation, conduction and convection all play a part in the dissipation of heat from



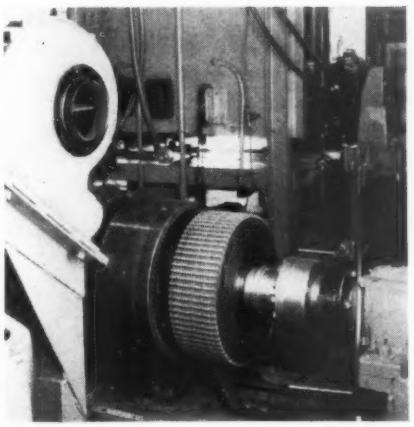
Testing clutch facings to determine coefficient of friction, wear, and torque capacity. (Courtesy Raybestos Division, Raybestos-Manhattan, Inc.)



Automatic machine for testing friction materials to destruction under predetermined loads and speeds. (Courtesy Raybestos Division, Raybestos-Manhattan, Inc.)

brakes and clutches, convection is by far the most important. That is why freely-circulating air should be allowed to sweep across the rubbing surfaces where the temperatures are the highest, and where cooling convection currents are, therefore, most effective.

If possible, see that cool air can flow through the mechanism from underneath and escape upward as it becomes heated. Try to keep friction materials entirely free from the metal against which they rub when brakes or clutches are not engaged. A clear space between the two rubbing surfaces allows the escape of heat. In some cases it is desirable to



Clutch about to undergo test to destruction. Machine automatically engages and disengages clutch. Loads and speeds are adjustable. (Courtesy Raybestos Division, Raybestos-Manhattan, Inc.)

provide a blower fan to supply cooling air, although there is usually something wrong with the design, the operation or the climate when this is necessary.

Although they may not look so pretty, rough unpainted brake and clutch mechanisms give up heat better than smooth or painted mechanisms. If paint must be used, make it black. White paint on a bright machined surface makes a brake or clutch stay hot longer, and so do other light colors.

Correct Repairing A good repairman, before he takes off friction material, will examine its condition and check for out-of-round bands, uneven or localized wear, scored or checked drums, charred or brittle conditions, clearances, mechanical imperfections, lack of lubrication, evidence of oil or grease on the rubbing surfaces, etc.

Almost invariably he will find that a mechanical defect, bad adjustment, improper application, wrong operation, careless maintenance or just plain neglect are the cause of the premature wearing out of friction

Friction-material laboratory where bands, cones and disks are tested. (Courtesy Raybestos Division, Raybestos-Manhattan, Inc.)

materials. Seldom will he find that the friction materials themselves were at fault.

True, it sometimes happens that some other friction material (usually a costlier one) stands up better than the kind that failed, but this is usually (and merely) because the new friction material will stand abuse or neglect which should not exist.

The repairman, having made corrections of mechanical parts, then has the job of selecting and applying the friction materials.

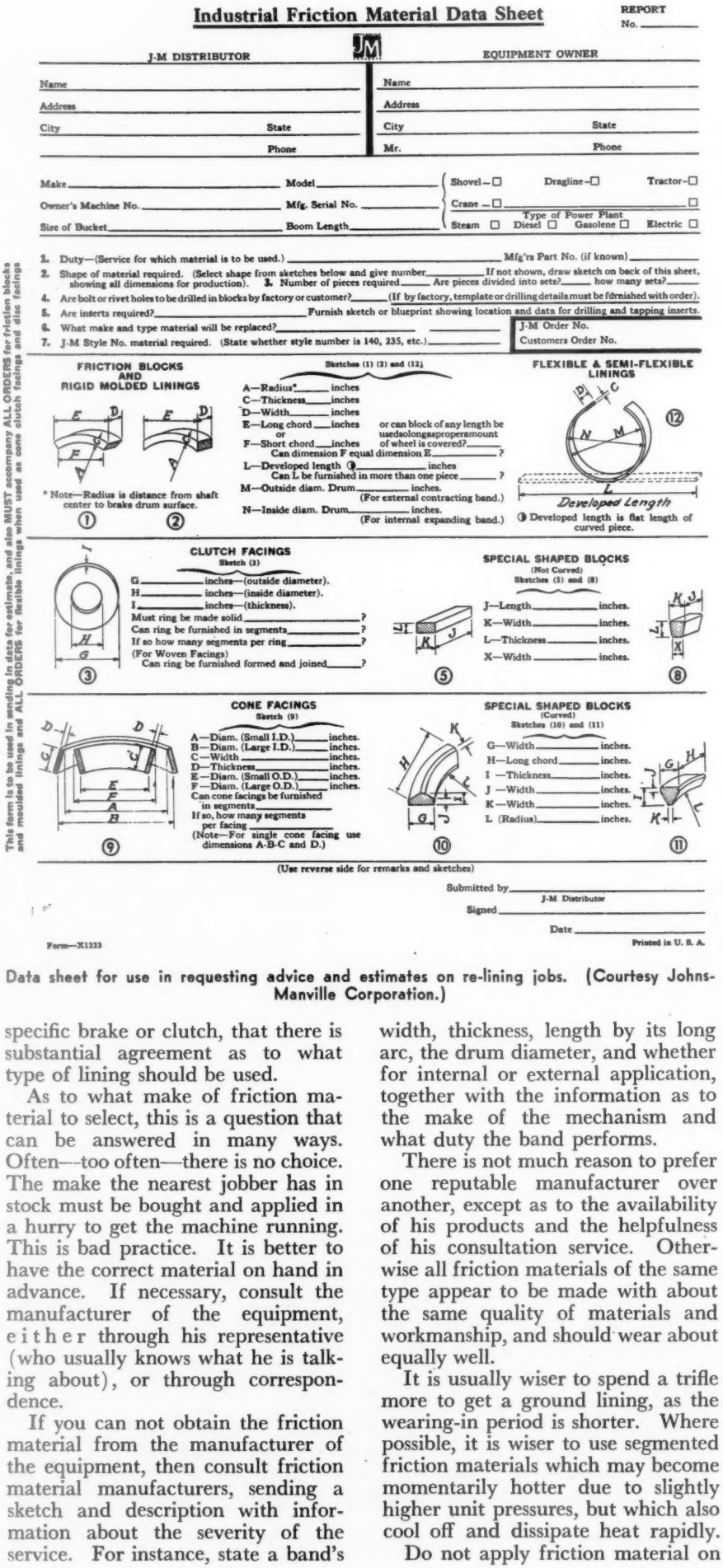
Correct Selection If the friction materials originally applied appear to have worn out too rapidly, either by burning, delamination, pulling away from the rivets or bolts, or in some other manner, this is not so often the fault of the friction materials as is commonly believed. Usually what has happened when the original friction materials seem to have failed is that there is something wrong with the adjustment, repairs, maintenance or operation.

Therefore, the first thing to do, after examining the condition of the friction material, is to check the condition of the mechanism, following the suggestions offered earlier in this article. When satisfied that the brake or clutch is mechanically in good condition and being properly operated, *then, and only then,* is the time to start thinking about replacing the original friction material with some other type than that originally applied.

It is easy to get all snarled up in figures on unit pressures, horsepower transmitted or absorbed per square inch of friction surface, British thermal units generated per square inch under continuous operation, coefficients of friction, etc. But there is no need to go into all that sort of thing so long as the reputable manufacturers of friction materials provide tables and charts that give the answer to every problem on brake and clutch linings that is likely to be encountered.

The engineers of friction-material manufacturers, working closely with equipment manufacturers, are familiar with the loads carried, freguency of operation, temperatures developed, types of mechanisms and other factors involved. Ordinarily it will be found, on comparing the recommendations of different manufacturers of friction materials for any

Ten-ton truck used for testing automotive brake blocks. (Courtesy Raybestos Division, Raybestos-Manhattan, Inc.)



Industrial Friction Material Data Sheet

REPORT No. _____

J-M DISTRIBUTOR — EQUIPMENT OWNER

Name / Address / City / State / Phone

Make _____ Model _____ Owner's Machine No. _____ Mfg. Serial No. _____ Size of Bucket _____ Boom Length _____

Shovel – ☐ Dragline – ☐ Tractor – ☐ Crane – ☐ ☐

Type of Power Plant: Steam ☐ Diesel ☐ Gasolene ☐ Electric ☐

1. Duty—(Service for which material is to be used.) _____ Mfg'rs Part No. (if known) _____
2. Shape of material required. (Select shape from sketches below and give number _____ If not shown, draw sketch on back of this sheet, showing all dimensions for production). 3. Number of pieces required _____ Are pieces divided into sets? _____ how many sets? _____
4. Are bolt or rivet holes to be drilled in blocks by factory or customer? _____ (If by factory, template or drilling details must be furnished with order).
5. Are inserts required? _____ Furnish sketch or blueprint showing location and data for drilling and tapping inserts.
6. What make and type material will be replaced? _____
7. J-M Style No. material required. (State whether style number is 140, 235, etc.) _____

J-M Order No. / Customers Order No.

FRICTION BLOCKS AND RIGID MOLDED LININGS — Sketches (1) (2) and (12)

A—Radius* _____ inches
C—Thickness _____ inches
D—Width _____ inches
E—Long chord _____ inches or F—Short chord _____ inches (or can block of any length be used so long as proper amount of wheel is covered?)
Can dimension F equal dimension E _____ ?
L—Developed length ◑ _____ inches
Can L be furnished in more than one piece _____ ?
M—Outside diam. Drum _____ inches. (For external contracting band.)
N—Inside diam. Drum _____ inches. (For internal expanding band.)

* Note—Radius is distance from shaft center to brake drum surface.

FLEXIBLE & SEMI-FLEXIBLE LININGS — Developed Length

◑ Developed length is flat length of curved piece.

CLUTCH FACINGS — Sketch (3)

G _____ inches—(outside diameter).
H _____ inches—(inside diameter).
I _____ inches—(thickness).
Must ring be made solid _____ ?
Can ring be furnished in segments _____ ?
If so how many segments per ring _____ ?
(For Woven Facings)
Can ring be furnished formed and joined _____ ?

SPECIAL SHAPED BLOCKS (Not Curved) — Sketches (5) and (8)

J—Length _____ inches.
K—Width _____ inches.
L—Thickness _____ inches.
X—Width _____ inches.

CONE FACINGS — Sketch (9)

A—Diam. (Small I.D.) _____ inches.
B—Diam. (Large I.D.) _____ inches.
C—Width _____ inches.
D—Thickness _____ inches.
E—Diam. (Small O.D.) _____ inches.
F—Diam. (Large O.D.) _____ inches.
Can cone facings be furnished in segments _____
If so, how many segments per facing _____
(Note—For single cone facing use dimensions A-B-C and D.)

SPECIAL SHAPED BLOCKS (Curved) — Sketches (10) and (11)

G—Width _____ inches.
H—Long chord _____ inches.
I —Thickness _____ inches.
J —Width _____ inches.
K—Width _____ inches.
L (Radius) _____ inches.

This form is to be used in sending in data for estimate, and also MUST accompany ALL ORDERS for friction blocks and moulded linings and ALL ORDERS for flexible linings when used as cone clutch facings and disc facings

(Use reverse side for remarks and sketches)

Submitted by _____ J-M Distributor
Signed _____
Date _____

Form—X1233 — Printed in U. S. A.

Data sheet for use in requesting advice and estimates on re-lining jobs. (Courtesy Johns-Manville Corporation.)

specific brake or clutch, that there is substantial agreement as to what type of lining should be used.

As to what make of friction material to select, this is a question that can be answered in many ways. Often—too often—there is no choice. The make the nearest jobber has in stock must be bought and applied in a hurry to get the machine running. This is bad practice. It is better to have the correct material on hand in advance. If necessary, consult the manufacturer of the equipment, e i t h e r through his representative (who usually knows what he is talking about), or through correspondence.

If you can not obtain the friction material from the manufacturer of the equipment, then consult friction material manufacturers, sending a sketch and description with information about the severity of the service. For instance, state a band's width, thickness, length by its long arc, the drum diameter, and whether for internal or external application, together with the information as to the make of the mechanism and what duty the band performs.

There is not much reason to prefer one reputable manufacturer over another, except as to the availability of his products and the helpfulness of his consultation service. Otherwise all friction materials of the same type appear to be made with about the same quality of materials and workmanship, and should wear about equally well.

It is usually wiser to spend a trifle more to get a ground lining, as the wearing-in period is shorter. Where possible, it is wiser to use segmented friction materials which may become momentarily hotter due to slightly higher unit pressures, but which also cool off and dissipate heat rapidly.

Do not apply friction material on out-of-round bands. Sometimes a repairman will apply a flexible friction material to try to compensate for out-of-roundness. The flexible material will conform to the distorted band, but neither the lining nor the band will fit the drum snugly, and by the time the job is run in, the high spots are likely to have been ground down so much that the lining is dangerously weakened. There is nothing wrong with flexible friction material, but it should not be used in an attempt to cure out-of-round bands. The only workmanlike thing to do is to true up the band before applying lining of any type.

Drilled friction materials are not always suitable for replacements. The reason is because the hole centers may have changed, or the parts may have become distorted so the pre-drilled friction materials will not fit. It is no trick at all to drill and countersink friction materials, and it is usually better practice unless the repairman is absolutely positive that the holes in the shoes or bands will line up exactly with the pre-drilled holes.

As to whether or not friction material should have wire in it for the reinforcement of woven lining, or metallic chips to stabilize friction and create smoother action, that is a matter which might well be left to the manufacturers of equipment or friction materials after they have been advised of conditions.

Correct Application It is reasonably easy to apply friction materials correctly, but there are certain things to watch out for. Be sure that shoes and bands are lined up and not warped or otherwise out of alignment or adjustment. Watch out for elongated or enlarged rivet or bolt holes. Rather than trying to use larger rivets or bolts, weld them full and then redrill. It is almost impossible to fasten friction materials securely when rivets or bolts do not fit the holes tightly. Loose rivets or bolts cause early failure. Always use brass or copper rivets or brass bolts if they are obtainable. If you can not get them, use the soft-steel rivets or bolts supplied by the manufacturers.

A good job of relining needs little running in, but whatever running in is done should be watched carefully and not attempted until the repairman is positive that the mechanism is in perfect condition, with bands or shoes correctly aligned. There is not much sense in trying to grind down high spots in the friction material when those high spots are caused by out-of-round bands or misadjusted shoes.

War Projects, TVA Dams Keep Plants of Birmingham Slag Company Busy

IN the prosecution of the war the nonmetallic-minerals industries have played a part which, although of vital importance, has not been given wide publicity outside this field, nor have any producers to our knowledge received recognition in the form of Army and Navy "E," or similar, awards.

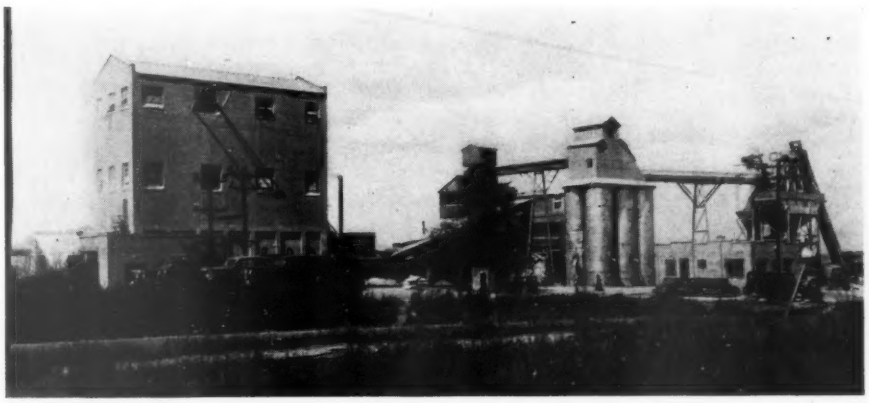
The record of the Birmingham Slag Company's activities in the past few years, while not exactly typical, is indicative of the magnitude of the contributions to the war effort made by aggregate producers. In the nearly three years that have elapsed since the people of this country began to feel war conscious, this company has produced over 12,000,000 tons of crushed slag, sand and gravel, and crushed stone, over 1,000,000 cubic yards of ready-mixed concrete, large quantities of cold asphaltic paving material and millions of concrete-masonry tile, brick, block, and other building units. In 1942 its total production of mineral aggregates was about 5,250,000 tons and in 1941 somewhat less. A total production of about 3,500,000 tons of aggregates is expected this year and the drop in concrete production is expected to be greater in percentage. In fact, the construction of military projects in the southeastern states seems to be coming to a close shortly.

The Birmingham Slag Company has for many years been one of the largest producers of crushed slag, sand and gravel, and ready-mixed concrete in the southeast. Originally a producer of crushed-and-screened blast-furnace slag at permanent plants for strictly commercial consumption, sand and gravel and concrete were first produced by the company from temporary plants when the Tennessee Valley Authority and other federal projects created large temporary local demands which could not be served economically from existing permanent plants. The experience and facilities acquired for and through this work proved invaluable when our entry into the war created a tremendous expansion in the war plant and training facilities in the South.

The company was organized in 1910 to load pit-run slag for railroad ballast. Its first crushing-and-screening plant was built in 1912 at Ensley with a daily capacity of 600 tons. The present ownership acquired the company on February 1, 1916, and started building its plant No. 1 at Ensley that fall, with modified slag pits near the six blast furnaces of the Tennessee Coal, Iron & Railroad Company, to process the 4,000 tons of slag produced every 24 hours when all six furnaces were in blast.

The company's production of crushed-and-screened slag has grown with the expansion of the iron-and-steel industry in the Birmingham area. At present four permanent slag plants with a total daily capacity of 10,000 tons are operated at Ensley, Fairfield, Thomas and Alabama City. These plants are handling the entire output of thirteen blast furnaces—nine operated by the Tennessee Coal, Iron & Railroad Company, and four by the Republic Steel Corporation. In processing this slag considerable iron scrap is recovered, which would have been lost in slag dumps if this material had not been crushed and screened. This iron is returned to the iron and steel mills.

Slag is shipped to ten southern states from Tennessee to Florida and from the Carolinas to Texas and has been used in the construction of many vital industrial projects in recent years. Since Pearl Harbor, the construction of many war projects has been speeded up and rushed to completion ahead of schedule by using large daily tonnages of slag. Recent examples are the Ferry Command Base, a naval air-training station and Wolf Creek Ordnance Plant in Tennessee, the army air base and the naval air base with supplemental fields in Florida; ordnance plants near Huntsville, Gadsden, Anniston, Childersburg and Birmingham, bomber modification plant and military-training centers in Alabama; Marietta aircraft assembly plant, Atlanta General De-



Fairfield slag, asphalt-mixing, and ready-mixed-concrete plants.

Alabama City slag crushing and screening plant.

pot; training camps in Arkansas, Mississippi, Louisiana; and a steel mill in Texas. Thousands of tons of roofing slag cover acres and acres of buildings recently constructed for the Army's Charlotte Quartermaster Depot, the Marines' Camp Le Jeune, and the Charleston Navy Yard.

All the temporary sand, gravel, and crushed-stone plants operated by the slag company were located in Tennessee and North Carolina, and supplied 4,500,000 tons of concrete aggregates to the Tennessee Valley Authority for the construction of six concrete dams between January 1940, and March 1943. Watts Bar on the Tennessee River, Apalachia on the Hiwassee River and Ocoee No. 3 on the Ocoee River used 2,200,000 tons of sand and gravel while 2,300,000 tons of crushed stone were used in the Cherokee on the Holston River, the Chatuge on the Hiwassee River and Douglas Dam on the French Broad River.

Concrete-batching plant at Alabama City.

The construction of Douglas Dam in thirteen months was a record-breaking achievement for the engineering and construction department of the Tennessee Valley Authority—not a moment's delay for coarse or fine aggregate although fine aggregate had to be manufactured at the dam site from dolomitic limestone as natural sand was not available.

A 15-inch dredge with attendant floating screening and towing equipment is furnishing sand-and-gravel concrete aggregate for a large War Department project in the vicinity of Knoxville, Tennessee.

In addition to the concrete aggregates furnished the Tennessee Valley Authority, the slag company excavated from the Tennessee River 700,000 cubic yards of material for coffer-dam fill and river-channel improvements at the Watts Bar and Fort Loudoun Dams.

Over 1,000,000 cubic yards of ready-mixed concrete have been furnished from temporary plants by the slag company since November 1940, when it commenced delivery of 90,000 cubic yards of concrete to the Reynolds Metals Company and the Reynolds Metal Alloys, Inc., at Sheffield, Alabama. Other important war projects in Alabama are: Gadsden Ordnance Plant, Anniston Ordnance Depot, Huntsville Arsenal and Ordnance Depot, Gadsden Air Forces Supply Depot, Camp Sibert Chemical Warfare Service, and concrete for a new blast furnace, additions to coke ovens, etc., at Gadsden for the Defense Plant Corporation, acting by and through Republic Steel Corporation. The Mississippi Ordnance Depot used 53,000 cubic yards from a temporary plant.

An additional 40,000 cubic yards were dry-batched and delivered to a contractor's paving mixers from the company's Alabama City supplemental batching plant for the paving of aprons and runways for the airport at Camp Sibert. For all of this work the Birmingham Slag Company at one time had seven Blaw-Knox batching plants in operation and a fleet of 100 transit mixer trucks in addition to two permanent plants at Fairfield and Alabama City. The company's permanent plant at Fairfield has supplied more than 200,000 cubic yards for extensions to the plants of the Tennessee Coal, Iron & Railroad Company and the Republic Steel Corporation nearby. All the trucking for the Birmingham Slag Company including that of ready-mixed concrete, is handled by Drummond Trucking Corporation, a subsidiary of which F. M. Taylor is president. Many dump trucks and other types are used to deliver other products and to do contract hauling for other concerns.

Ensley slag plant with part of the dump seen in the foreground.

An asphalt plant at Fairfield has shipped large quantities of "Enslag Colmix," a cold asphaltic-paving material, to some fifteen or twenty airfields and army training centers in Alabama, Tennessee, Mississippi, Georgia, and Florida. Considerable of this material was also produced for military and access highways in those states.

Concrete-products plants are operated at the Ensley and Alabama City slag plants. Large quantities of concrete block, tile, and brick, have been supplied for war-housing projects, hospitals, barracks, ordnance depots, and similar types of construction from Texas to Florida. Production and sales are directed by A. E. Lloyd.

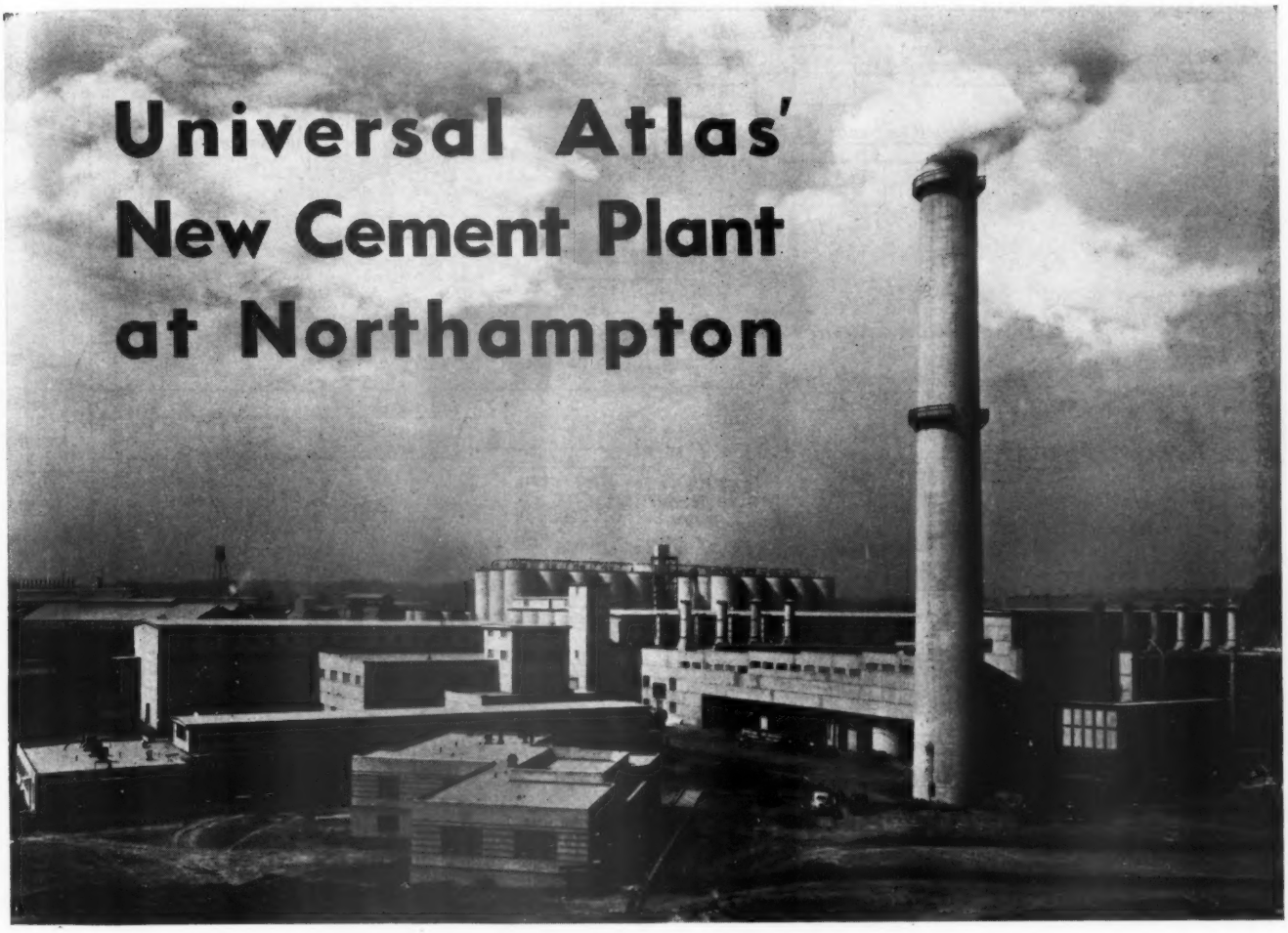
The officers of the Birmingham Slag Company are: C. Eugene Ireland, president; George C. McCullough, vice-president and general manager; C. Barney Ireland, vice-president; N. L. Smith, treasurer; C. A. Barinowski, secretary and sales manager; R. E. Burgess is assistant general manager and J. C. Friddle is general superintendent. The company's home office is at 2019 Sixth Avenue, North, Birmingham.

Short, Short Story

"Injury," said the workman.
"Inattention," said the foreman.
"Inflammation," said the physician.
"Incurable," said the hospital.
"Incredible," said the mourners.
"Interred," said the undertaker.
"In Peace," said the tombstone.

—*The Delta*

Universal Atlas' New Cement Plant at Northampton



Gray and White Cements Produced in Separate Processing Departments; Raw-Material Flotation System Is Employed

another ON THE SPOT report

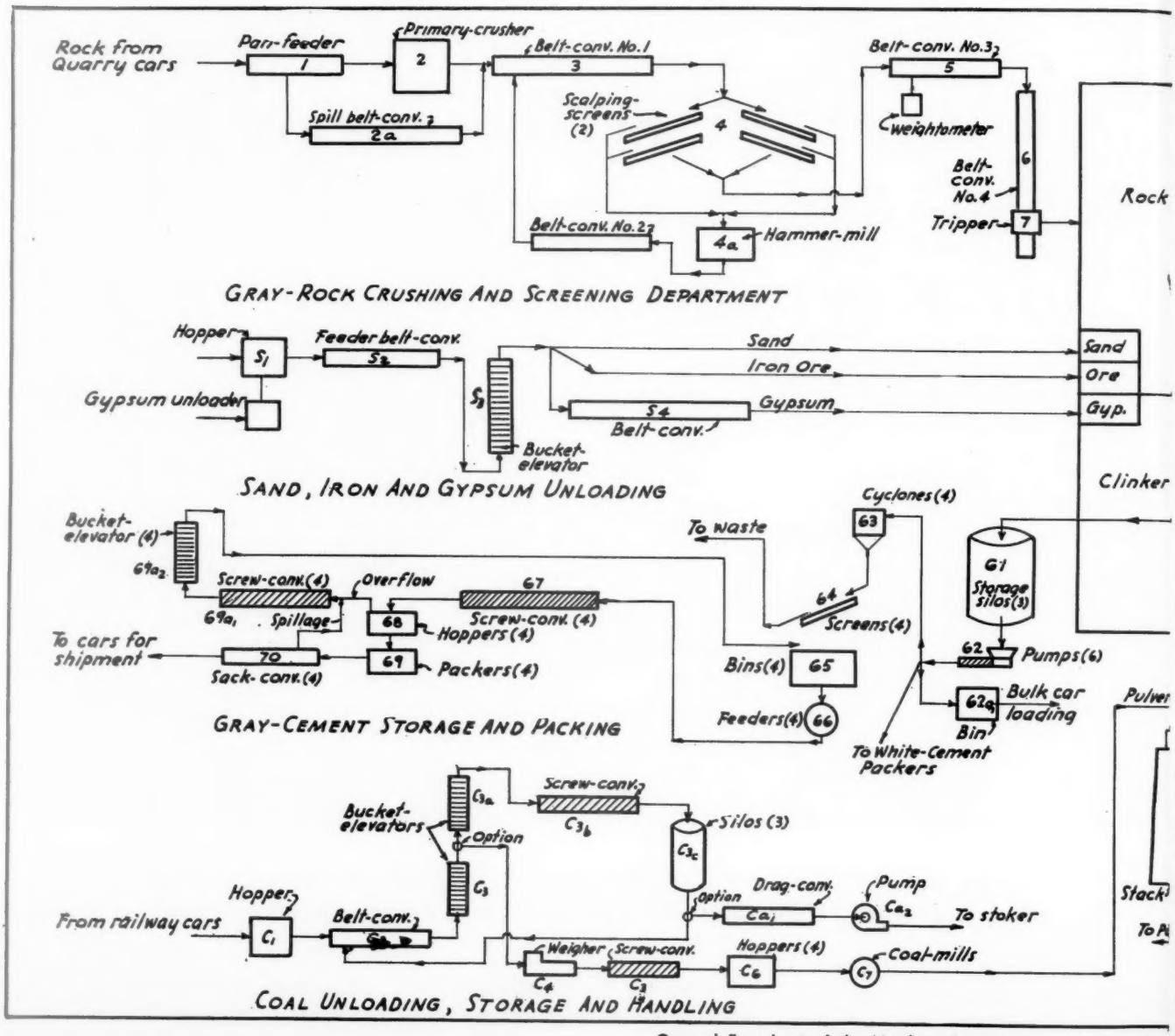
By W. E. TRAUFFER

THE new plant of the Universal Atlas Cement Company at Northampton, Pennsylvania, which has just gone into operation, is not quite the largest ever built, but in every other way it sets a standard which others will attempt to equal. Designed by one of the best and most experienced staffs of engineers in the industry, this plant incorporates all the latest proved features of design, equipment and operation. No reasonable expense was spared to make this plant as efficient and as attractive as possible. A leading architect designed many of the buildings and the others were designed to blend with them into a harmonious whole.

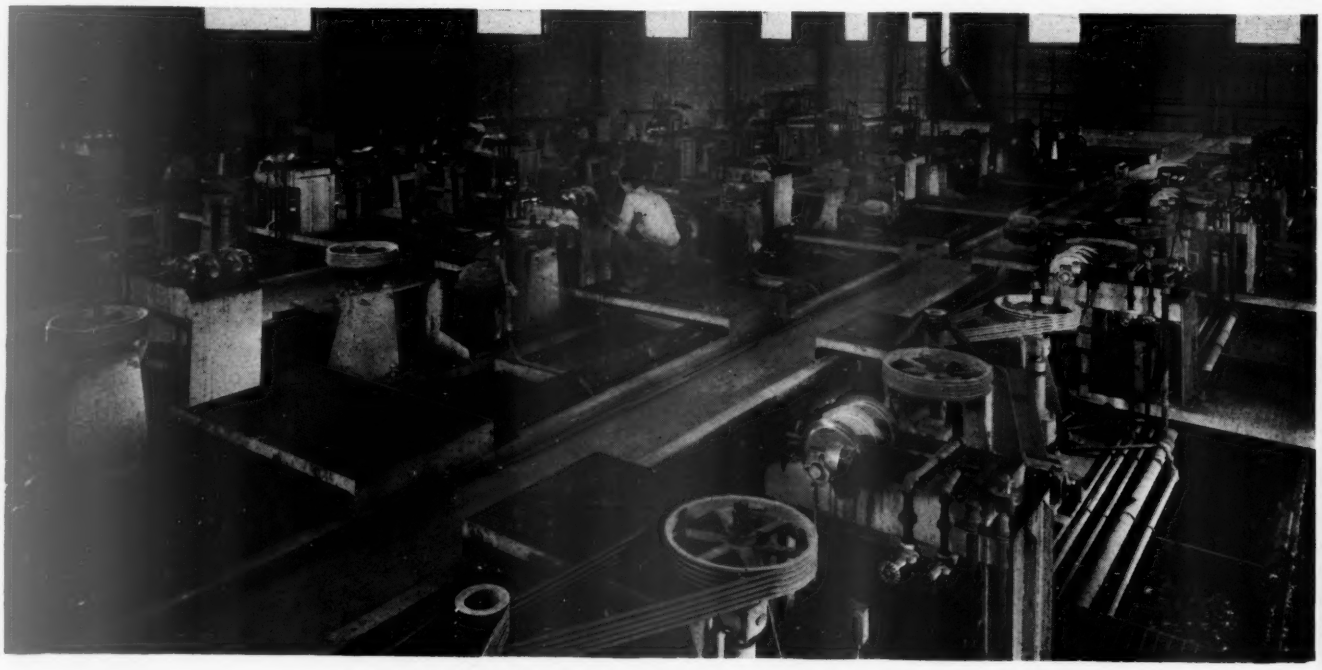
This plant is the latest and most modern in this country to be designed from the ground up to incorporate the Breerwood system of raw-material flotation as a regular operating department. This system is by far the most important development in the cement industry since the advent of the rotary kiln and makes possible the production of any desired present or future type of gray cement from an ordinary or even inferior raw material. If desired the raw material can by-pass the flotation department and be prepared by closed-circuit wet grinding, a system which also is far in advance of current practice.

Actually this operation consists of two plants, one for the manufacture of gray cements and the other for the manufacture of white cement. Each of these plants has its own equipment throughout, including the crushing, raw-grinding, blending, clinker-grinding, storage and packing departments. The only exceptions are the white cement kiln and cooler which can also be used to supplement the three gray-cement kilns and coolers when the additional capacity is needed. The white-cement pack-house can also be used for gray cement.

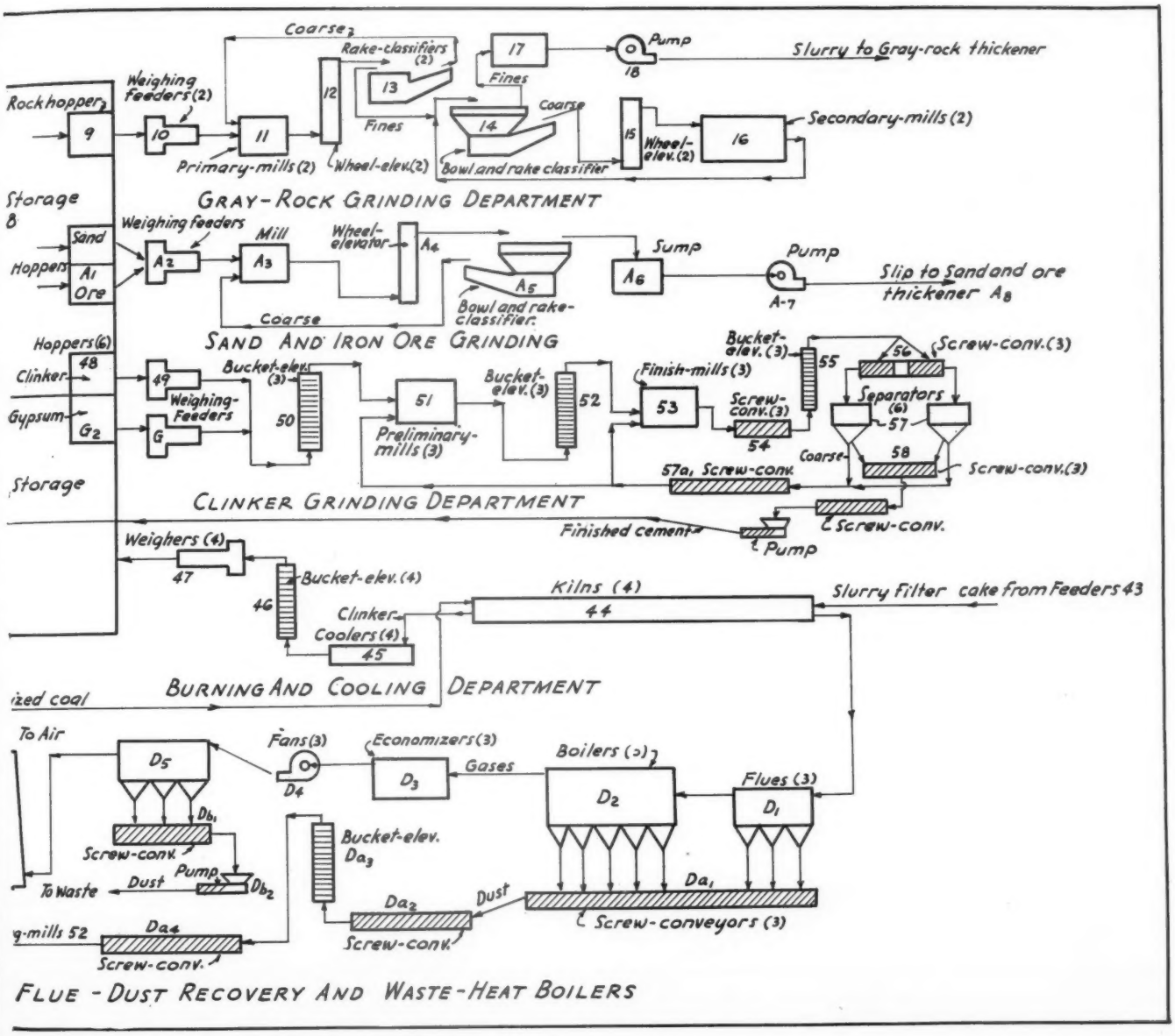
General Design In designing this plant consideration was given to the growing demand in recent years for cements of different chemical compositions for different uses, a trend which is expected to continue after war-time restrictions are lifted. This trend has compelled cement manufacturers to make several different types of cement by variations of chemical composition. This is generally done by adding silica, iron and lime to the standard mixture, a procedure which necessarily increases the cost of the product. After considerable study it was found to be more practical to make a wide variety of differently-proportioned cement raw materials by a process of subtraction rather than addition. The process used—the Separation Process Company's system of mineral separation by centrifugal classification and froth flotation—makes it possible to discard the undesirable aluminates and silicates from the ample supply of impure limestone available from the company's property rather than by



General flow-sheet of the Northampton gray-cement operations.



A view in the cell-house showing most of the flotation equipment.



Key numbers refer to tabular analysis which follows.

The Number 1 kiln at right can be used for either gray or white cement.

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE UNIVERSAL ATLAS CEMENT COMPANY'S GRAY-CEMENT PLANT AT NORTHAMPTON, PENNSYLVANIA

(Key numbers refer to corresponding numbers on the accompanying flow-sheet)

PART I

	Operation	Key	Equipment	Model Number, Size, Capacity or Type	Motors	Power Transmission
ROCK CRUSHING, CONVEYING, SCREENING, CRUSHING AND STORING	Primary Crushing		(From cars)			
		1	Feeder	60-in. by 18½-ft. heavy-duty, pan-type	20-hp.	Gear reducer
			(Stone to 2; spillage to 2a)			
		2	Crusher (To 3)	Fairmont 36- by 60-in. Type B	300-hp.	Flat belt
		2a	Conveyor (To 3)	Belt, 24-in. 18 ft.	2-hp.	Gearmotor and chain
	Scalping and Secondary Crushing		(From 2, 2a and 5a)			
		3	Conveyor No. 1	Belt, 36-in. by 305 ft., 475-f.p.m.	100-hp.	Gear reducer
		4	Screens (2) (Oversize to 5; fines to 6)	Ty-Rock, Type 600, 5- by 12-ft., 2-deck, vibrating	10-hp.	Texrope V-belts
		5	Crusher (To $5a_1$)	Super-Thor, reversible hammer-mill, Size C-15-48	600-hp.	Direct
		$5a_1$	(From 5) Conveyor No. 2 (To 3)	Belt, 30-in. by 110 ft., 475-f.p.m.	30-hp.	Gearmotor and chain
			(Fines from 4)			
		6	Conveyor No. 3	Belt, 30-in. by 500-ft., 475-f.p.m.	40-hp.	Gear reducer
			Weight meter	Weightometer		
		7	Conveyor No. 4 Tripper (To 8)	Belt, 30-in. by 179-ft., 475-f.p.m. Movable	20-hp.	Gearmotor and chain
SAND, IRON-ORE AND GYPSUM HANDLING	Sand and Iron-Ore Unloading	S_1	(From cars) Hopper	Track, concrete, 10- by 12-ft.		
		S_2	Feeder (To S_3)	Belt, 24-in. by 12-ft.	5-hp.	Gearmotor and chain
	Gypsum Unloading	G_1	(From cars) Unloader (To S_1)	Scraper type	5-hp.	Gearmotor and chain
	Sand, Ore and Gypsum Handling	S_3	(From S_2) Elevator (Sand and ore to 8; gypsum to S_4)	Bucket, dual	10-hp.	Gearmotor and chain
	Gypsum Handling	S_4	(From S_3) Conveyor (To 8)	Belt, 18-in. by 60-ft.	5-hp.	Gearmotor and chain
RAW-MATERIAL STORING	Rock Sand, Iron-Ore, Gypsum and Clinker Storage	8	(From 7, S_3, S_4 and 47) Storage Building	624- by 104-ft., cap. 25,000 tons rock, 1,500 tons sand, 1,300 tons iron ore, 900 tons gypsum, 200,000 bbl. clinker		
			Cranes (2)	Traveling bridge, 100-ft. span	100-(4), 75-(2), 15-(2) hp.	
			Buckets (2) (Stone, sand and iron ore to 9; clinker to 48; gypsum to G_1)	Clamshell, 5-cu. yd., 4 line		
GREY-CEMENT RAW-GRINDING DEPARTMENT	Preliminary Raw Grinding		(From 8)			
		9	Hoppers (2)	Concrete, 12- by 12-ft.		
		10	Feeders (2)	Feedoweight, 24-in. by 12-ft., automatic weighing and recording	2-hp. (2)	Speed reducers (2)
			(From 10 and 13)			
		11	Ball-mills (2)	9½- by 8 2-3-ft., 55,000-lb. load	350-hp. synchronous (2)	Direct-connected
		12	Elevators (2)	Sand wheel 16-in. by 8 ft. diameter	20-hp. (2)	Texrope V-belts
		13	Classifiers (2)	Multizone rake, 8- by 25½ ft., Type DSFXM	20-hp. (2)	Texrope V-belts
			(Coarse to 11; fines to 14)			
	Final Raw-Grinding		(From 13 and 16)			
		14	Classifier (Coarse to 15; fines to 17)	Bowl, 27-ft. diameter with 16- by 40½-ft. rake	Bowl 7½-hp. (2)	Texrope V-belts
				Heavy-duty, Type QSFXB	Rake 20-hp. (2)	Texrope V-belts
		15	Elevator	Sand wheel, 15-ft. diameter by 25-in.	10-hp. (2)	Gearmotor and chain
		16	Ball-mills (2) (To 14)	9½- by 8 2-3-ft., 60,000-lb. load	350-hp. synchronous	Direct-connected
	Waste Disposal		(From 14)			
		17	Sump	Concrete		
		18	Pump No. 49 (To 19)	Nagle, 10-in., Centrifugal	200-hp.	Texrope V-belts

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE UNIVERSAL ATLAS CEMENT COMPANY'S GRAY-CEMENT PLANT AT NORTHAMPTON, PENNSYLVANIA

(Key numbers refer to corresponding numbers on the accompanying flow-sheet)

PART II

	Operation	Key	Equipment	Model Number, Size, Capacity or Type	Motors	Power Transmission
RAW-MATERIAL FLOTATION	Raw-Rock Thickening and Separating	19	(From 18) Thickener (Solids to 20; water to 19a1)	200-ft. diameter, 25,000-bbl., Type SSG, torque-arm	3-hp.	Motor-reducer
		19a1	Tank (Water to raw mill for rinse or to waste)	200-ft. diameter		
		20	(From 19) Pumps (2) Nos. 9 and 10 (To 21 and, or 34)	Nagle, 5-in. centrifugal	30-hp. (2)	Texrope V-belts
		21	(From 20 and 23) Turbomixer (Underflow to 22; overflow to 32)	14-ft. diameter by 20-ft., 61,450-gal.	15-hp.	Gearmotor
		22 23 24	Pump No. 7 Tank (Slurry to 24; overflow to 21) Centrifuges (2) (Cake to 24a1; affluent to 25 or 32)	Nagle, 6-in. centrifugal Constant-level 54- by 70-in. solid-bowl, continuous	50-hp. 125-hp. Adjusto-Spede	Texrope V-belts Texrope V-belts
	Centrifuge-Cake and Slurry Mixing	24a1 24a2 24a3	(From 24) Conveyor (From 24a and 33) Mixer (Solids to 24a3; overflow to 32) Pump No. 14 (To 34)	Screw, 20-in. Wash-mill, 10-ft. diameter by 6-ft. Nagle, 5-in. centrifugal	10-hp. 20-hp. 15-hp.	Gearmotor Gear reducer Texrope V-belts
	Cell-Feed Preparation	25 26 27	(From 24 and 27) Turbomixer (Solids to 26; overflow to 32) Pump No. 8 Tank (To 28; overflow to 25)	14-ft. diameter by 20-ft., 61,450-gal. Nagle, 8-in. centrifugal Constant-level	15-hp. 75-hp.	Gearmotor Texrope V-belt
	Carbonaceous Concentrate Removal and Disposal	28	(From 27) Cells (12) (Concentrate to 28a1; tailings to 29)	Fagergren, Size 66, 14-in. diameter rotors, 22-in. stators	15-hp.	Texrope V-belts (24)
		28a1 28a2	(From 28 and 31) Pump No. 23 Sump	Nagle, 6-in. centrifugal Waste	60-hp.	Vulco Rope V-belts
	Roughing Cells	29	(From 28) Cells (20) (Concentrate to 32; tailings to 30)	Fagergren, Size 66, 14-in. diameter rotors, 22-in. stators	15-hp. (20)	Texrope V-belts (40)
	Scavenging Cells	30	(From 29 and 31) Cells (24) (Concentrate to 31; tailings to 28a1)	Fagergren, Size 66, 14-in. diameter rotors, 22-in. stators	15-hp. (24)	Texrope V-belts (48)
	Cleaning Cells	31	(From 30) Cells (16) (Concentrate to 32; tailings to 31a1)	Fagergren, Size 66, 14-in. diameter rotors, 22-in. stators	15-hp.	Texrope V-belts (32)
	Cell Recirculation	31a1	(From 31) Pumps (4) Nos. 24, 25, 26, and 27 (To 30)	Nagle, 4-in. centrifugal	15-hp. (16)	Vulco Rope V-belts
	Cell-Product Thickening and Pumping	32	(From 21, 24, 24a2, 25, 28a2, 29 and 31) Thickener (Solids to 33; overflow to 32a1)	200-ft. diameter, 25,000-bbl., Type SSG, torque-arm	3-hp.	
		32a1	(From 32) Tank (Water to constant level tanks over turbomixers)			
		33	Pumps (2) Nos. 4 and 5 (To 24a, 34 or A8)	Nagle, 4-in. centrifugal	15-hp. (2)	Texrope V-belts
SAND AND IRON-ORE GRINDING, THICKENING AND HANDLING	Sand and Iron-Ore Grinding and Classifying	A1 A2 A3 A4 A5	(From 8) Hopper Feeder (From A2 and A8) Ball-mill Elevator Classifier (Coarse to A3; fines to A6)	Concrete, 12- by 12-ft. Feedoweight, weighing and recording 8- by 7 2-3-ft., 40,000-lb. load Sand wheel, 8-ft. diameter by 16-in. Bowl, 10-ft. diameter, with 6- by 31½-ft. rake, heavy-duty Type DSFXB	 1-hp. 200-hp. synchronous Bowl 1½-hp., variable-speed; rake 7½-hp.	 Speed-reducer Direct-connected Texrope V-belts
	Slip Handling and Thickening	A6 A7	(From A5) Sump Pump No. 48 (To A8)	Nagle, 4-in. centrifuga	25-hp.	Texrope V-belts
		A8 A9	(From A7 and 33) Thickeners (2) Pumps (2) Nos. 12 and 56 (To A8 or 34)	50-ft. diameter, Type SG, torque-arm Nagle, 4-in. centrifugal	1-hp. (2) 15-hp.	Gearmotor and chain Texrope V-belts

TABULAR ANALYSIS OF THE OPERATIONS AND EQUIPMENT OF THE UNIVERSAL ATLAS CEMENT COMPANY'S GRAY-CEMENT PLANT AT NORTHAMPTON, PENNSYLVANIA

(Key numbers refer to corresponding numbers on the accompanying flow-sheet)

PART III

	Operation	Key	Equipment	Model Number, Size, Capacity or Type	Motors	Power Transmission
ROCK SLURRY AND CLAY AND ORE SLIP-BLENDING AND HANDLING	Slurry Blending and Handling		(From A_9, 20 and $24a_3$)			
		34	Tanks (8)	Blending, 30-ft. diameter by 22-ft., 1,600-bbl.	5-hp. (8)	Texrope V-belts
		35	Sump	Mixing		
		36	Pumps (3) Nos. 1, 2 and 3	Nagle, 8-in. centrifugal	40-hp. (3)	Texrope V-belts
			(To 34 or 37)			
	Slurry Storing and Handling	37	(From 36 and $37a_1$) Tanks (2)	Kiln-storage 80-ft. diameter, 17,000-bbl.	15-hp. (2)	Motor reducers (2)
		$37a_1$	(From 37) Pumps (2) Nos. 31 and 32 (To 37)	Nagle, 5-in. centrifugal	25-hp. (2)	Texrope V-belts
		38	(From 37) Pumps (2) Nos. 29 and 30 (To 39)	Nagle, 5-in. centrifugal	15-hp. (2)	Texrope V-belts
SLURRY FILTERING, CAKE MIXING, BURNING AND COOLING	Slurry Feeding and Filtering		(From 38)			
		39	Tanks (8)	24-ft. diameter by 20-ft., 900-bbl.	5-hp. (8)	Texrope V-belts
		40	Pumps (4)	Nagle, 3-in. centrifugal	25-hp. (4)	Texrope V-belts
		41	Filters (8) (To 42)	Disk-type rotary, 8-ft. 10-in. diameter, Six 9-disk, two 6-disk	5-hp. (4)	Gearmotors
	Filter-Cake Mixing and Feeding		(From 41)			
		42	Mixers (4)	Pug mill, 24-in. by 16-ft.	40-hp. (4)	Reducers (4)
		43	Feeders (4) (To 44)	Pumpcrete, 6-in. pumps	25-hp. variable speed d. c. (4)	Chains
	Burning and Cooling		(Filter coal from 43; coal from C_7)			
		44	Kilns (4) (Clinker to 45; dust to D_1)	Rotary, all-welded, three 10½- by 250-ft., one 9- by 248-ft.	125-hp. variable speed d. c. (4)	Reducer
		45	Coolers (4) (Clinker to 46)	Vibrating grate-type, 4½- by 40-ft. (3) Inclined grate-type, 6 by 30-ft. (1)	10-hp. (3)	Texrope V-belts
	Weighing		(From 45)			
		46	Elevators (4)	Bucket	10-hp.	Gearmotor and chain
		47	Weightmeters (4) (To 8)	Weightometer, 24-in. pivoted	2-hp. (4)	Gear reducers (4)
CLINKER FEEDING AND PRELIMINARY GRINDING	Clinker Feeding		(From 8)			
		48	Bins (3)	Concrete, 12- by 12-ft.		
		49	Feeders (3) (To 50)	Feedoweight 24-in. by 8-ft. 2-in., weighing and recording	5-hp. (3)	Motor reducers (3)
	Gypsum Feeding		(From 8)			
		G_2	Bins (3)	Concrete, 12- by 12-ft.		
		G_3	Feeders (3) (To 50)	Feedoweight	3	Motor reducers
	Preliminary Grinding		(From 49 and G_3)			
		50	Elevators (3)		10-hp. (3)	Gearmotors and chains
			(From 50 and 57)			
		51	Ball-mills (3) (To 52)	Preliminator, 9½- by 8 2–3 ft., 53,000-lb. load	400-hp. synchronous (3)	Direct-connected
FINISH GRINDING AND SEPARATING	Finish Grinding		(From 51)			
		52	Elevators (3)		15-hp. (3)	Gearmotors and chains
			(From 52 and 57)			
		53	Ball-mills (3)	Ball-Peb, 8- by 30-ft., 2-compartment, 85,000-lb. load	800-hp. synchronous (3)	Direct-connected
		54	Conveyors (3)	Screw, 18-in.	10-hp. (3)	Gearmotors and chains
		55	Elevators (3)	Bucket	30-hp. (3)	Gearmotors and chains
		56	Conveyors (3)	Screw, opposed-flight, 16-in.	10-hp. (3)	Gearmotors and chains
		57	Separators (6) (Coarse to $57a_1$; fines to 58)	16-ft. diameter, mechanical	75-hp. (6)	Texrope V-belts
	Rejects Recirculation	$57a_1$	(From 57) Conveyors (3) (To 51 or 53)	Screw, 16-in.	20-hp. (3)	Gearmotors and chains
	Cement Conveying		(From 57)			
		58	Conveyors (3)	Screw, 16-in., opposed-flight	10-hp. (3)	Gearmotors and chains
		59	Conveyor	Screw, 18-in.	15-hp.	Gearmotor and chain
		60	Pump (To 61)	10-in.	150-hp.	Direct-connected

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(Key numbers refer to corresponding numbers on the accompanying flow-sheet)

PART IV

	Operation	Key	Equipment	Model Number, Size, Capacity or Type	Motors	Power Transmission
CEMENT STORING, PACKING AND LOADING	Cement Storing	61	(From 60) Silos (30)	Circulator, reinforced-concrete, 26- by 110-ft., capacity 463,000 bbl.		
		62	(To 62 or direct to cars) Pumps (6) (To 63, 62a$_1$ or white-cement packers)	8-in. movable	125-hp. (6)	Direct-connected
	Cement Packing	63	(From 62) Cyclones (4)			
		64	Screens (4)	Hum-mer electric vibrating, Type 38		
		65	Bins (4)	Steel		
		66	Feeders (4)	Rotary	2-hp. variable speed	Speed-Trol motor and chain
		67	Conveyors (4)	Screw	5-hp. (4)	Gearmotor and chain
		68	Hoppers (4)	Steel		
		69	Packers (4) (Sacks to 70; spillage to 69a$_1$)	Modern, 4-tube	25-hp. (4)	Texrope V-belts
		70	Conveyors (4) (To cars for shipment)	Wire belt	2-hp.	Direct-connected
	Packer-Spillage Recirculation	69a$_1$	(From 69) Conveyors (4)	Screw	5-hp. (4)	Gearmotor and chain
		69a$_2$	Elevators (4) (To 65)	Bucket	15-hp. (4)	Direct-connected
	Bulk-Cement Loading	62a$_1$	(From 62) Bins (2)	Steel		
			Scales (To cars for shipment)	Track, 150-ton		
KILN GASES AND DUST	Kiln-Flue Dust Recovery and Gas Disposal	D$_1$	(From 44) Flue (Gases to D$_2$; dust to Da$_1$)			
		D$_2$	Boilers (3) (Gases to D$_3$; dust to Da$_1$)	Waste-heat, 3 drum, 11, 420-sq. ft., 28,000-lb. per hr., 1,510-hp.		
		D$_3$	(From D$_2$) Fuel Economizer	4, 420-sq. ft.		
		D$_4$	Fans (3)			
		D$_5$	Flue (Gases to D$_6$; dust to Db$_1$)			
		D$_6$	Stack (To atmosphere)	18-ft. diameter by 250-ft. reinforced-concrete		
	Flue-Dust Conveying	Da$_1$	(From D$_1$ and D$_2$) Conveyors (3)	Screw, 9-in.		
		Da$_2$	Conveyor	Screw		
		Da$_3$	Elevator	Bucket		
		Da$_4$	Conveyors (3) (To 42)	Screw		
	Waste-Dust Disposal	Db$_1$	(From D$_5$) Conveyor	Screw		
		Db$_2$	Pumping System (To waste)	5-in.		
COAL, UNLOADING, STORING, WEIGHING AND GRINDING	Coal Unloading and Storing	C$_1$	(From cars) Hopper (To C$_2$)			
		C$_2$	(From C$_1$ or C$_2$c) Conveyor	Belt, 24-in.	10-hp.	Gearmotor and chain
		C$_3$	Elevator No. 1 (To C$_3$a or C$_4$)	Bucket	10-hp.	Gearmotor and chain
		C$_3$a	Elevator No. 2	Bucket	10-hp.	Gearmotor and chain
		C$_3$b	Conveyor	Screw	25-hp.	Gearmotor
		C$_3$c	Silos (3) (To C$_2$ or Ca$_1$)	Concrete, 800-ton capacity		
	Coal Weighing and Grinding	C$_4$	(From C$_3$) Weightmeter	Weightometer, 24-in. pivoted	2-hp.	Gearmotor
		C$_5$	Conveyor	Screw	25-hp.	Gearmotor and chain
		C$_6$	Hoppers (4)			
		C$_7$	Mills (4)	Bowl, No. 493	150-hp. (4)	Direct-connected
			Fans (4) (To 44)			
	Coal to Auxiliary Boiler	Ca$_1$	(From C$_3$c) Drag Chains (2)		2-hp. (2)	Gearmotor and chains
		Ca$_2$	Conveying System (To stoker)	Airveyor	25-hp.	Direct-connected

adding high-grade limestone obtained from distant sources. This system has been thoroughly described in articles previously published in PIT & QUARRY.[1]

The use of two slurry-storage tanks ahead of the kiln-feed tanks makes it possible to switch from standard to high-early-strength cement manufacture within 48 hours and *vice versa*. They also make it possible to burn two different kinds of cement at one time, in addition to the white cement.

Unusual Features An unusual feature is the use of waste heat boilers in a wet-process plant. The kilns are operated in such a way as to produce the best possible cement clinker at the most efficient rate, and power production

[1]Breerwood (C. H.), Douglas (A. E.) and Engelhart (George K.)—*Minerals-Separation Process Used at Lone Star's New Argentina Plant.* PIT AND QUARRY, November 1938, pp. 52-56.

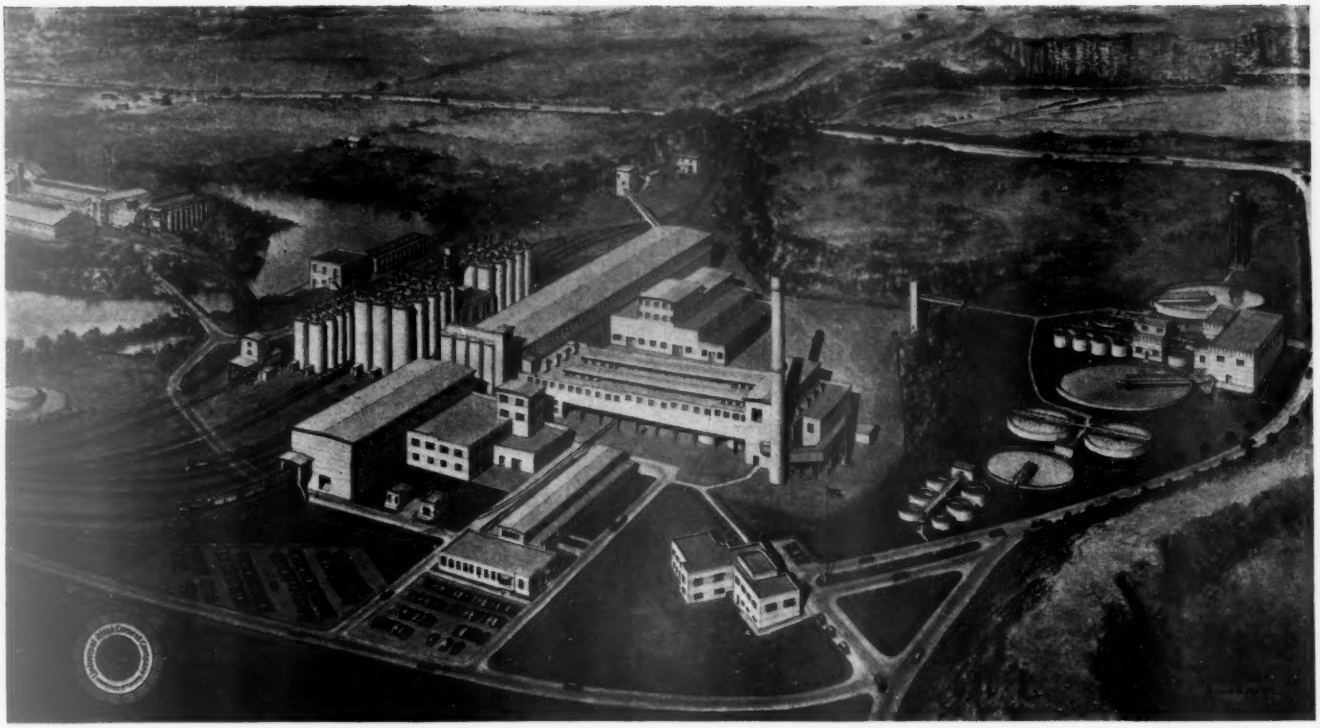
Franks (Fred B.)—*Raw-Material Flotation System Allows Production of Many Types of Cements.* PIT AND QUARRY, February 1941, pp. 36-40.

Posselt (E.) and Trauffer (W. E.)—*Design of New South American Cement Plant Takes Full Advantage of Breerwood Process of Flotation.* PIT AND QUARRY, November 1938, pp. 40-51.

Trauffer (W. E.) — *Flotation, Developed at Valley Forge, Allows Utilization of Low-Grade Rock.* PIT AND QUARRY, July 1941, pp. 57, 59, 61, 62, 63, 67, 69, 73.

Trauffer (W. E.)—*Permanente—Newest Name in the American Cement Industry.* PIT AND QUARRY, December 1940, pp. 27-43, 46-51, 53, 55, 57, 59.

Trauffer (W. E.)—*Standard and Special Cement Can Be Made of Inferior Raw Materials.* PIT AND QUARRY, July 1934, p. 41.



Artist's rendering of the entire new plant. Old plant across bridge at extreme left.

is incidental. In spite of this fact the three waste-heat boilers produce sufficient power to operate the entire grey-cement plant under normal conditions. The fourth auxiliary stoker-fired boiler is required only during rare peak periods or when the white-cement plant is also being operated.

The plant is fully metered, and weighing devices record the input and output of all materials. This will make possible the securing of accurate data on production, fuel and power consumption, efficiency, etc., which should be of great interest because of the importance of this plant.

Beauty was combined with utility wherever possible within reasonable limits. A leading architect designed the reinforced-concrete structures which supply the keynote for the design of the other buildings. The concrete structures include the main office and laboratory building, the flotation-cell house, the pump-house, the electric substation, the shop and change house, the pack-houses and sack-storage building, the turbine station, and the shell around the cooling tower. The architect also roughed out the other buildings in sufficient detail to carry the design throughout the plant but with enough difference in treatment to avoid monotony.

Most of the land in the immediate vicinity of the plant has been

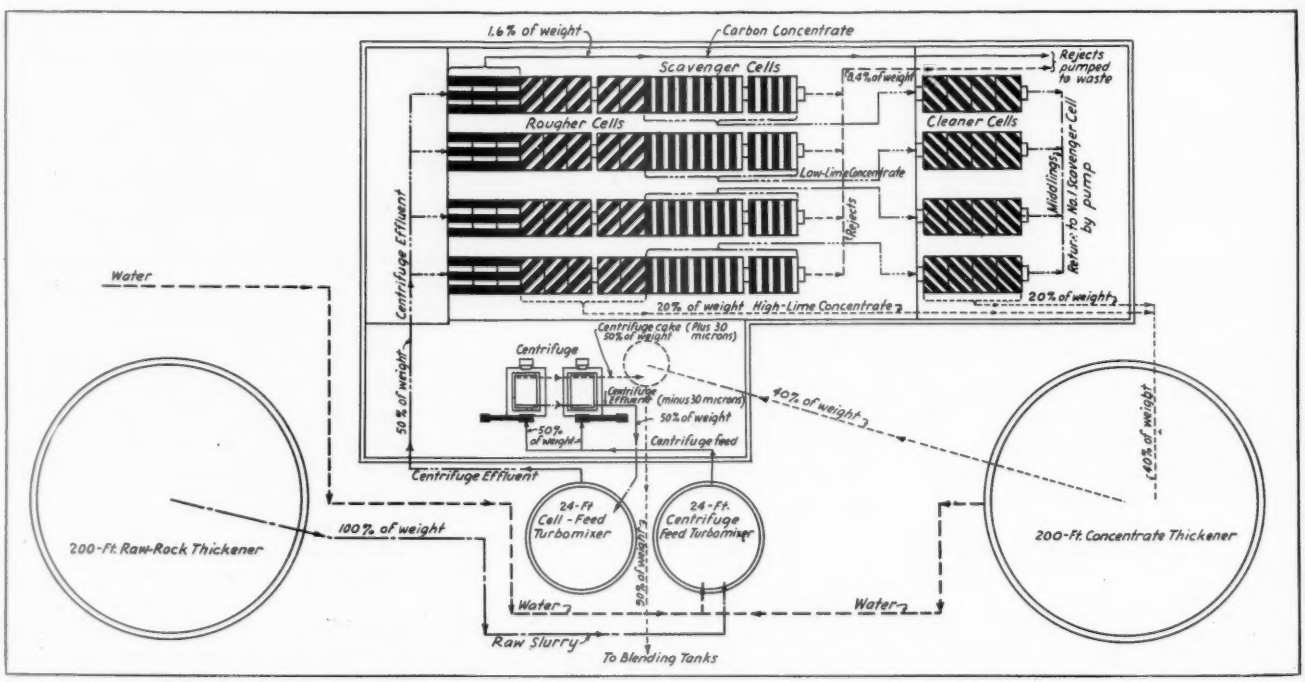
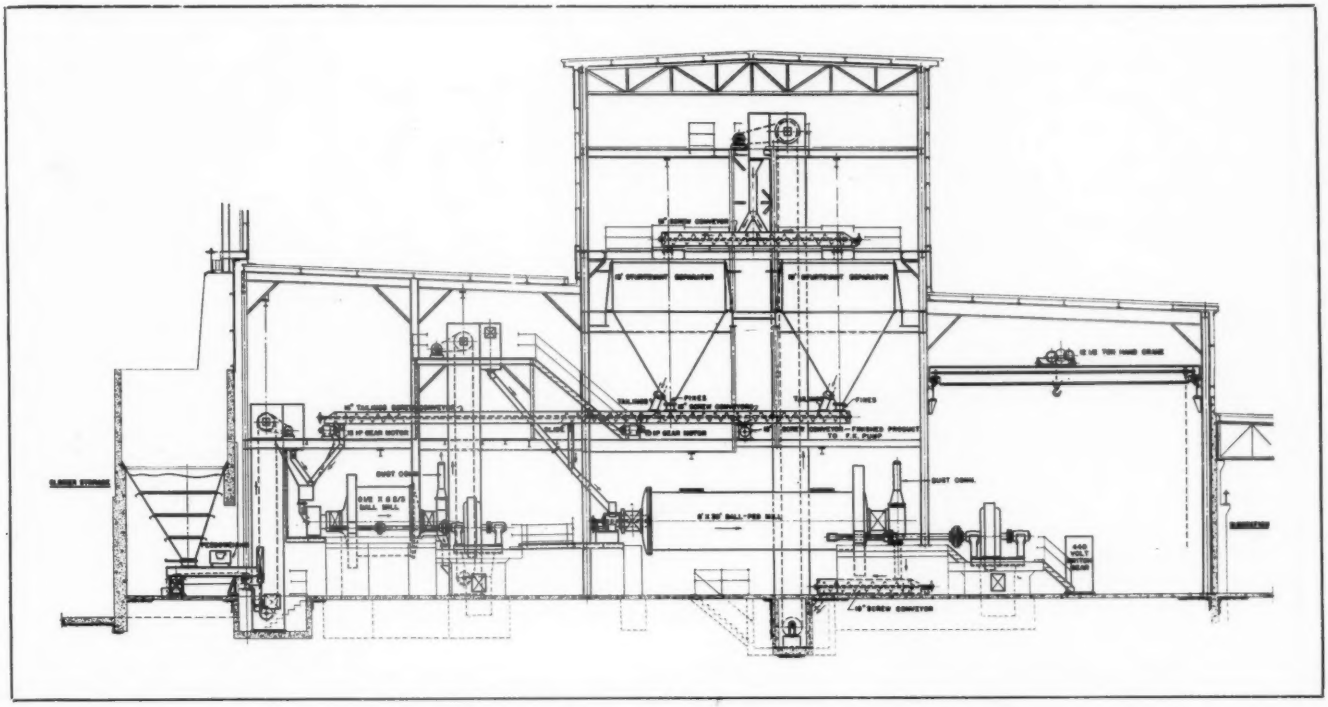


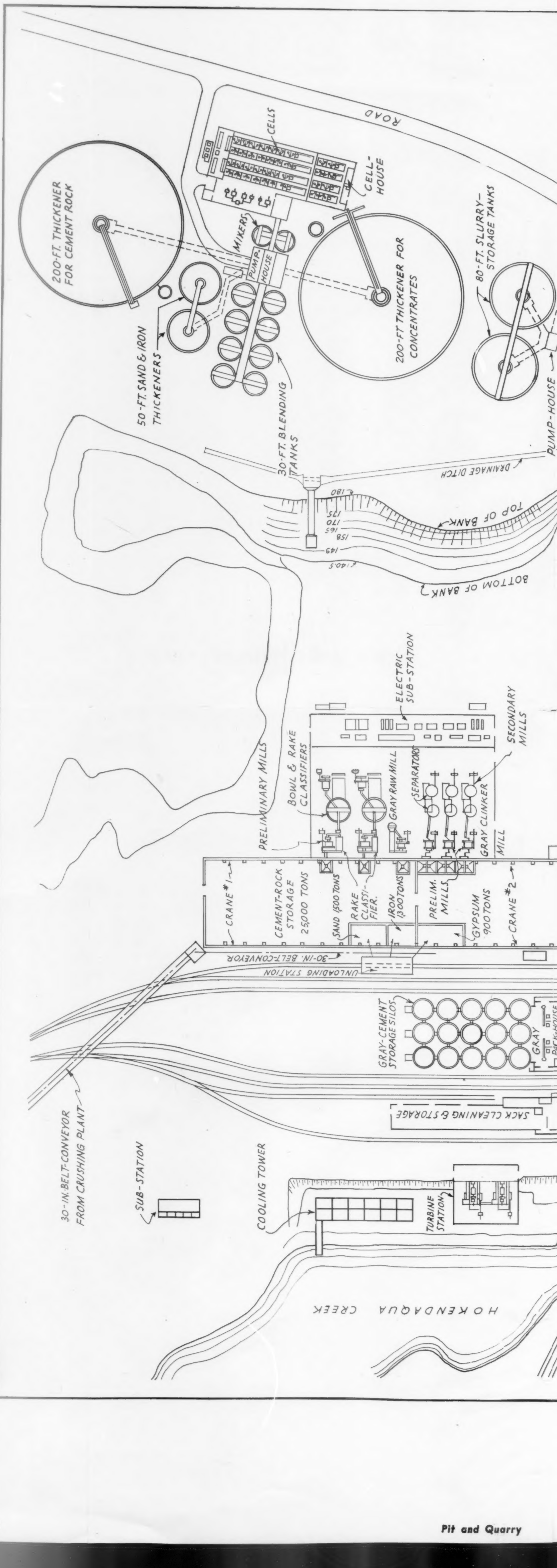
Diagram illustrating slurry flow through cell-house (Referred to in text as Flow-sheet Number 2).



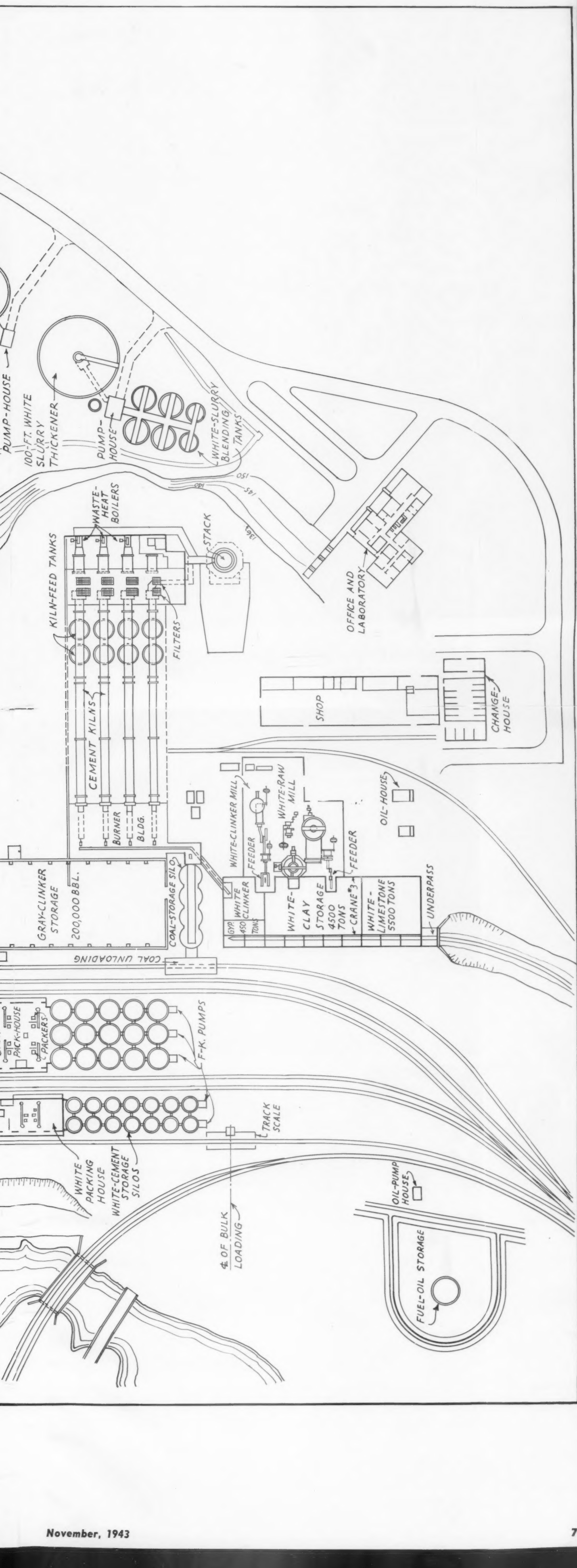
Elevation drawing of gray-cement clinker-grinding department.

General view of gray-cement clinker-grinding department showing finish mills, 16-foot separators, and storage compartments for grinding balls.

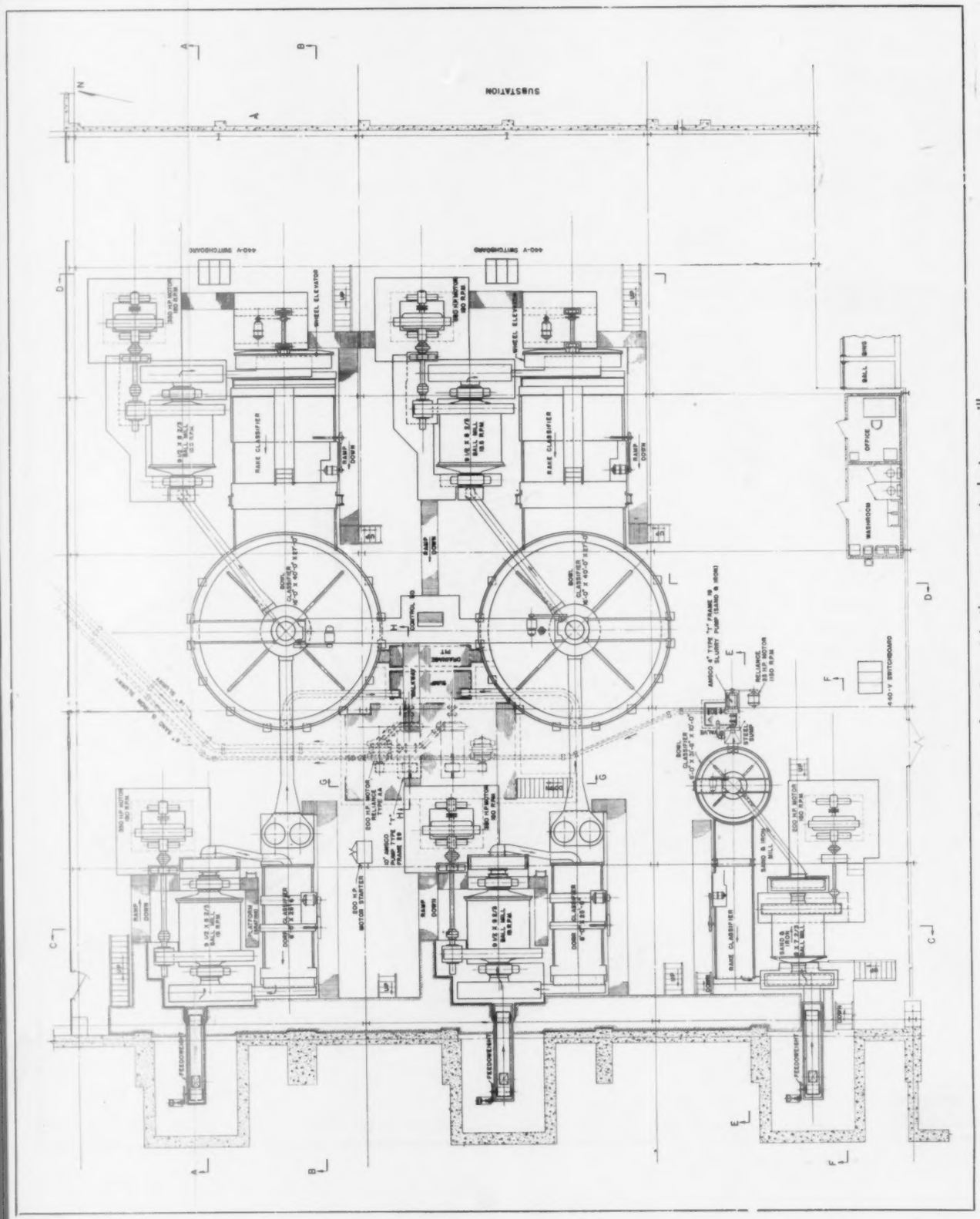
General Plan of Universal Atlas Cer



ment Company's Northampton Plant



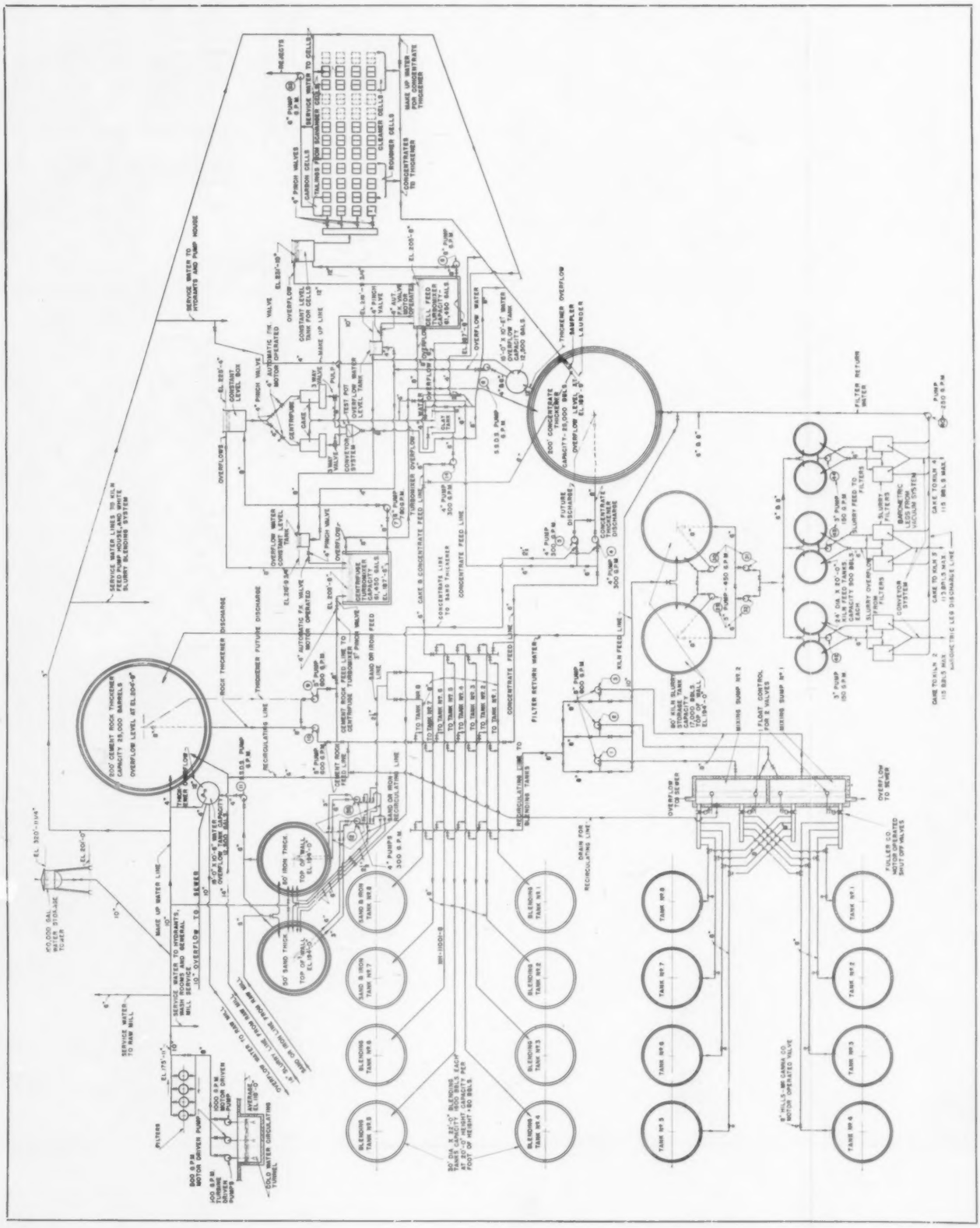
Raw-Grinding Mill



Arrangement of equipment in the gray-cement plant raw mill.

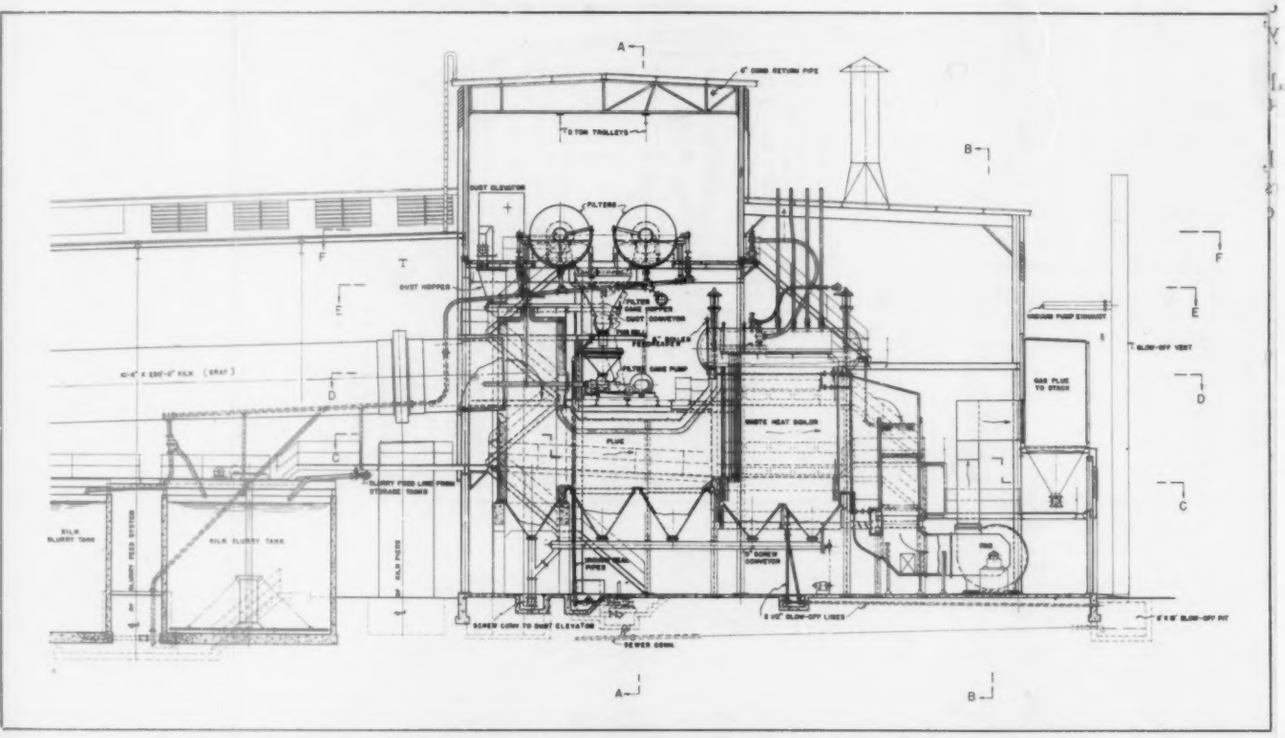
[Lift up—general plan inside]

Slurry-Flow Diagram

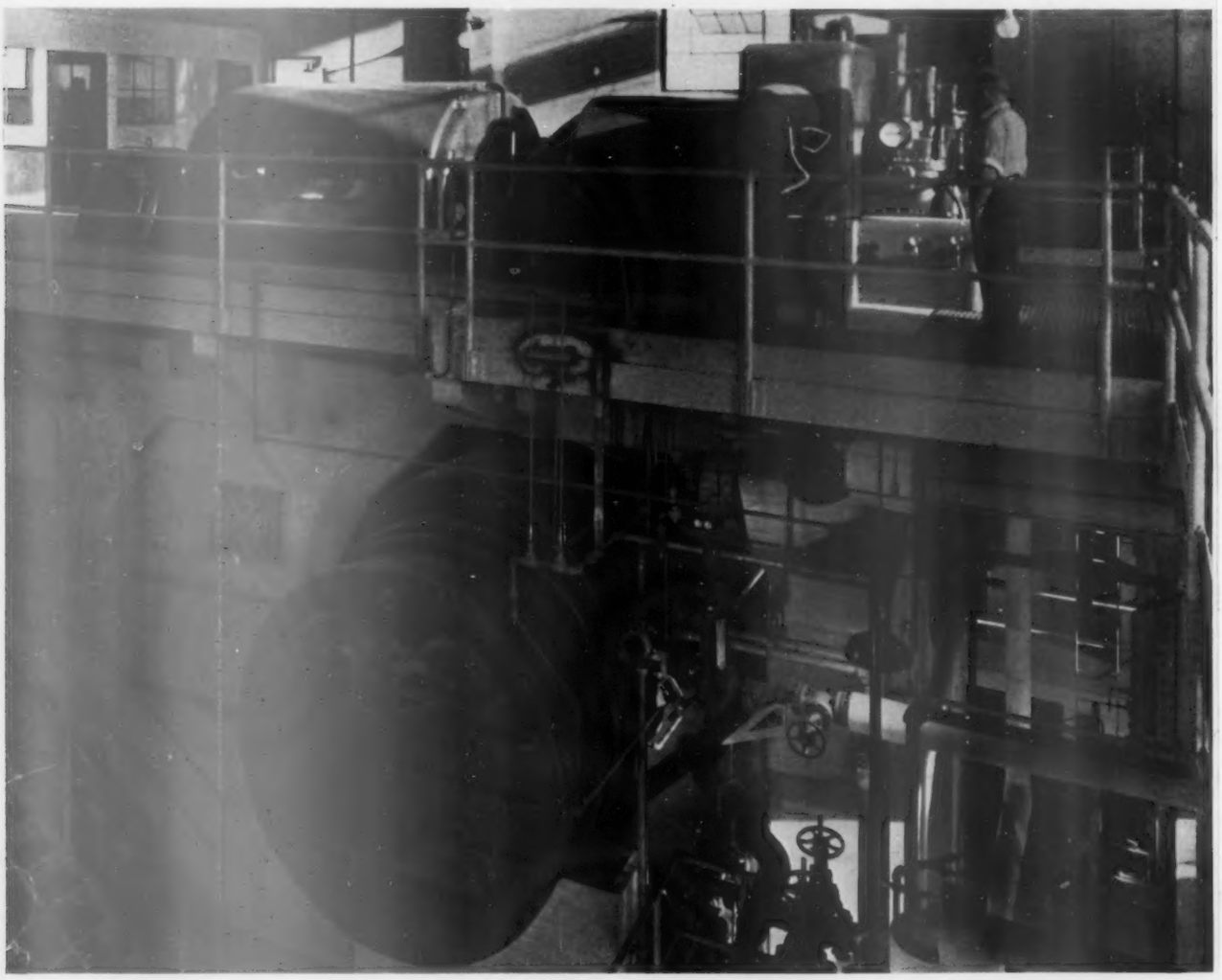


Slurry-flow diagram in the gray-cement plant.

[Lift up—general plan inside]



Elevation of kiln building and boiler house showing waste-heat-boiler arrangement.



The 5,000-kilowatt turbo-generator which converts waste heat into power. Condensers and related equipment below.

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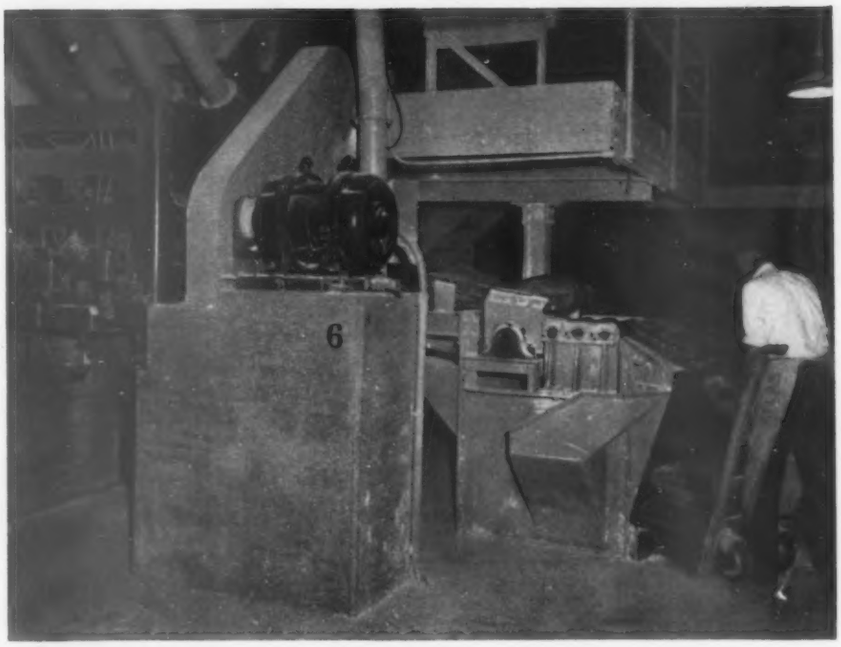
graded and some of it, especially that near the office, will be sodded, as is the company's custom at all its plants.

The mechanical layout of the plant was designed entirely by the company's large staff of mechanical, electrical, chemical, structural and operating engineers in cooperation with the companies supplying the important equipment. The achievement of the cement company's engineers is the more notable because of the difficulty of obtaining always the equipment desired. In some cases, where the equipment wanted was not available, other types were substituted and in other cases second-hand equipment was installed for use until new equipment again become available.

History This plant is the fifth to be built on the company's properties near Northampton since 1889. In that year the original Atlas Portland Cement Company started its first plant at Coplay, which is just across the Lehigh River from the present operation. What are said to have been the first successful rotary kilns were operated there. These kilns were 6 feet in diameter and 60 feet long and used oil for fuel until 1895, when the company developed its first pulverized-coal burner. Shortly thereafter the company acquired property on the Northampton side of the river and built its Number 2, 3 and 4 plants within the ensuing ten years. In 1930 the Atlas Portland Cement Company and the Universal Portland Cement Company united to form the Universal Atlas Cement Company.



Four-tube white-cement packer with electronic timer at left.

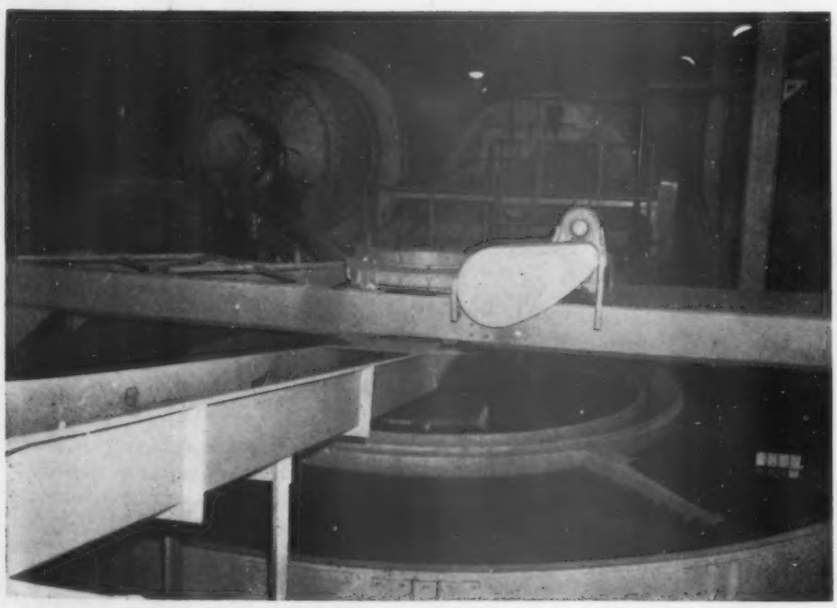
The Gray-Cement-Rock Quarry The quarry which provides the rock for gray-cement manufacture was originally of the hillside type with natural drainage. After the first level of 75 to 100 feet and the second level of 20 feet were taken out it still had natural drainage, but the starting of a third 40-foot level a few years ago necessitated the installation of drainage pumps. Three 12-inch, 100-horsepower vertical pumps, each rated at 2,000 g.p.m. at 150 foot head, are used for this purpose.

The latest level is now nearly worked out and a fourth 40-foot level is being developed and is supplying the stone for the new plant. The new face is being drilled by two electric crawler blast-hole drills with 6-inch bits. The blasting practice is standard.

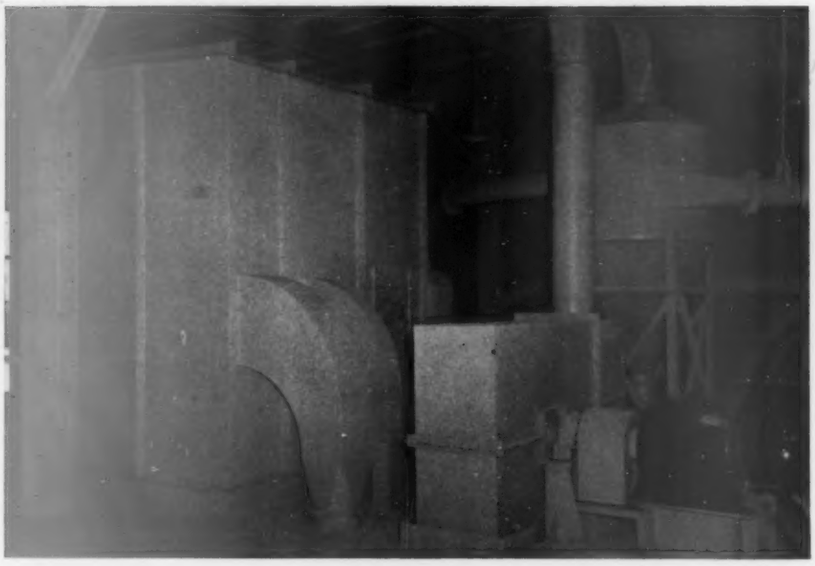
Three electric shovels with 2½-cubic yard dippers and electric controls load the stone into 12-cubic yard standard-gage side-dump cars. A large steam locomotive hauls the 8-car trains up a 2¼ per cent. grade to the top of the quarry, where smaller steam locomotives take over and haul them the remainder of the ¾-mile distance to the plant.

The new plant was designed for truck haulage to the primary-crusher building which is located near the entrance to the quarry. When they become available, gasoline tractors with 10-cubic yard, side-dump, semi-trailers will be used. These will be hauled up a 10-per cent., 750-foot incline by two electric hoists through the use of barney cars. A photoelectric-cell control system will be used. The trucks will operate under their own power in the quarry and to and from the top of the incline.

Primary Crushing At the crusher the stone is dumped from the cars by an air-cylinder dumping arrangement similar to the one in the company's Hudson plant. This cylinder operates a hook which pushes up on the bodies when dumping and then pulls them back into position. The cars are moved through the crusher building by an electric car-puller.

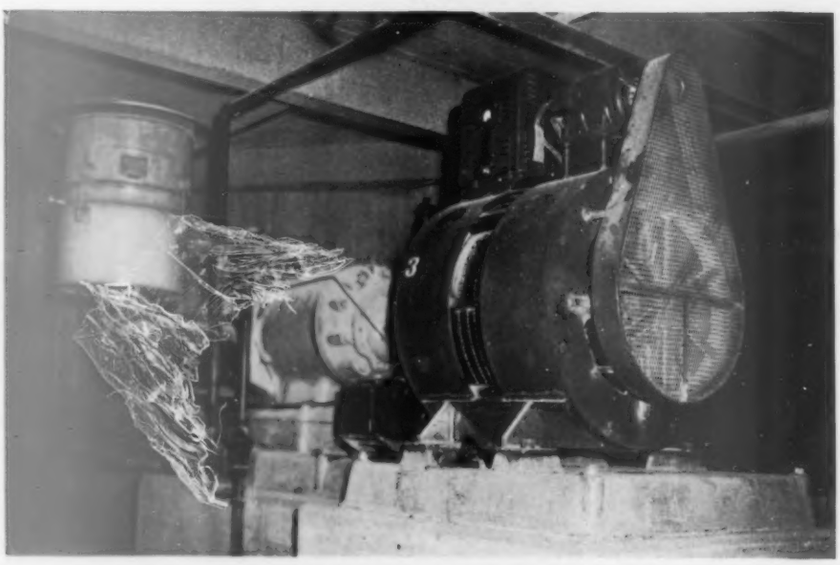


Bowl-and-rake classifier alongside secondary raw-mill.



One of the four sets of dust collectors in gray-cement pack house.

Valves on slurry lines in flotation-department pump house.



One of the rotary compressors which supply air to pumps under silos.

A 60-inch by 18-foot heavy-duty pan-feeder discharges the stone into the 36- by 60-inch Fairmont primary roll-crusher. It has a single roll which is driven at 48 r.p.m. by a 300-horsepower motor. The speed of the pan-feeder is usually about 18 feet per minute, but it can be regulated by the operator to prevent choking of the crusher. The crusher reduces the rock to 8-inch size and under at the rate of 500 tons per hour. The stone is discharged on a 36-inch by 305-foot-centers belt-conveyor (No. 1) which is the first of a series of three conveyors running to the storage building. A 24-inch by 18-foot belt-conveyor discharges the fine material which drops through the pan-feeder on the same conveyor.

Over the primary crusher there is a 12½-ton 30-foot span, hand-operated traveling crane. To this is attached an auxiliary 5-ton electric hoist which operates a stone hook.

Scalping and Secondary Crushing The first belt-conveyor (No. 1) discharges the stone on a pair of 5- by 12-foot Type 600 Ty-Rock two-deck screens with 2- and 1¼-inch openings on their top and bottom decks, respectively. The oversize rock from both decks of these screens is discharged into a Super Thor, Size C-15-48 reversible hammer-mill which is driven direct by a 600-horsepower motor. This machine has a capacity of 425 tons per hour. Its product is discharged on a 30-inch by 110-foot belt-conveyor (No. 2) which returns the rock to the belt-conveyor ahead of the screens, forming a closed circuit.

This building is kept clean by a dust-collector which is rated at 4,488 c.f.m and is connected to the screens, belt discharge, crusher discharge, chutes, etc.

The stone passing through the bottom decks of the screens is discharged on a 30-inch by 500-foot belt-conveyor (No. 3) running to the stone-storage building. A weight meter near the feed end of this conveyor keeps a record of the amount of stone entering the plant. A 30-inch by 179-foot horizontal belt-conveyor (No. 4) extends along one side of the storage building and stone is discharged from it into storage by a movable tripper. This arrangement makes possible the distribution of different grades of cement rock along the side of the storage as desired and aids in blending the stone to a uniform quality.

All the belt-conveyors operate at a speed of 475 f.p.m. and are car-

ried in steel structures inclosed with corrugated cement-asbestos siding and roofing. The flooring is made of pre-cast concrete slabs.

Storage The crushed rock, iron, sand and gypsum used for grey-cement manufacture and the gray-cement clinker are stored in one large building, while the ingredients for white cement are stored in a separate smaller storage building. The large storage building is 624 feet long and 104 feet wide and has separate compartments for rock, sand, iron, gypsum and gray-cement clinker.

This building has reinforced-concrete walls which are 25 feet high and are strengthened on the inside by counterforts rising 24 feet above them. These concrete columns support steel columns 23 feet high which in turn carry the roof trusses. The walls above the concrete consist of corrugated cement-asbestos siding and the roof is pre-cast featherweight concrete with a built-up composition covering. The counterforts also support steel girders and the track for the two traveling cranes which handle all the material in this building. Both are 15-ton all-welded bridge cranes of 100-foot span equipped with 5-cubic yard clamshell buckets and are operated by double-rail trolley systems on 220-volt direct current. One crane is ordinarily used for handling raw materials and the other for handling clinker and gypsum, but both travel the full length of the building and either one can supplement or take the place of the other in an emergency.

General view of the gray-slurry flotation plant.

Sand and Iron-Ore Unloading The sand and iron ore are brought to the plant in cars and are transferred to storage separately by the same system. They are discharged from the cars into a 10- by 12-foot track hopper from which a 24-inch by 12-foot feeder belt-conveyor discharges them into a double bucket-elevator with divided compartments. When sand or ore is being unloaded, the compartments on one side are used and for gypsum those on the other side are used. This prevents contamination of one material by another. From the elevator the sand and ore are spouted into their respective storage compartments.

Cars of gypsum, "spotted" for unloading by a car puller, are emptied by a power unloader comprising a shovel scraper, a hoist and a hopper. The same bucket-elevator feeds the gypsum to an 18-inch by 60-foot belt-conveyor which discharges it into the gypsum-storage compartment.

Raw-Rock Grinding The rock used for making gray cement is ground in two identical closed-circuit wet-grinding systems, each having primary and secondary stages. The primary mill for each system is fed from a bin by a device which has a complete automatic weighing and recording mechanism. The two 9½- by 8 2/3-foot primary ball-mills are loaded with 55,000 pounds of steel grinding balls and each is driven by a 350-horsepower synchronous motor. Each mill operates in closed circuit with an 8- by 25½-foot Heavy-Duty Multizone rake classifier.

The stone slip from each primary mill is picked up by an 8-foot diameter by 16-inch wide sand wheel which elevates it to a height from which it flows into the classifier in closed circuit with it. The reciprocating rake mechanism of the classifier moves the coarse particles which settle out in it up an incline from which they are discharged back into the mill.

The stone slip, containing only fine particles, overflows from the lower end of this classifier down a

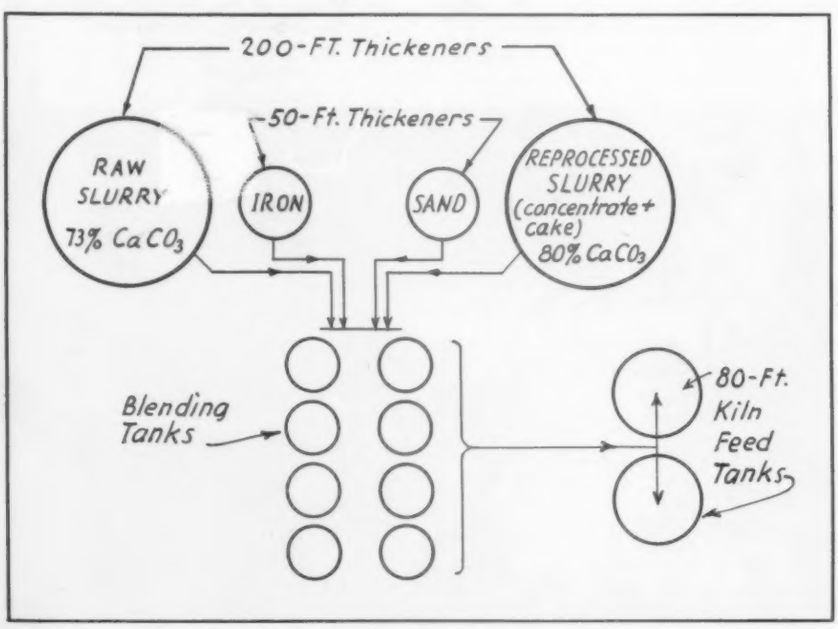
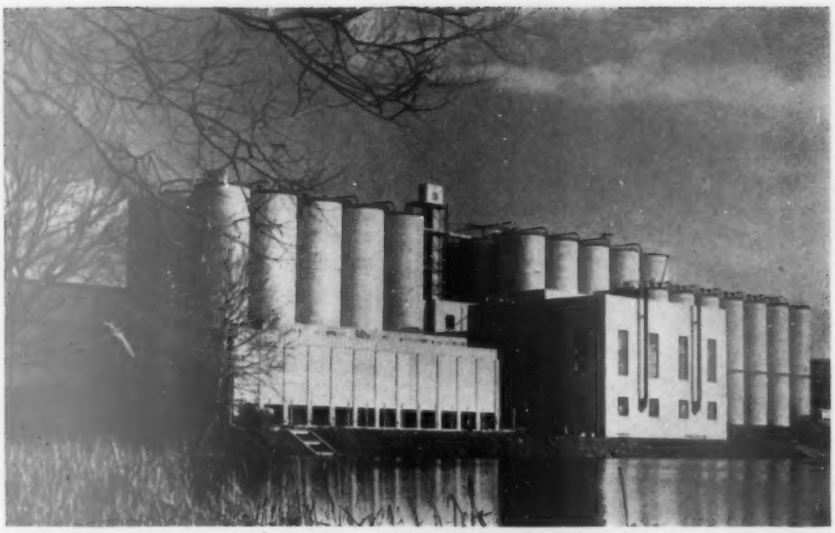
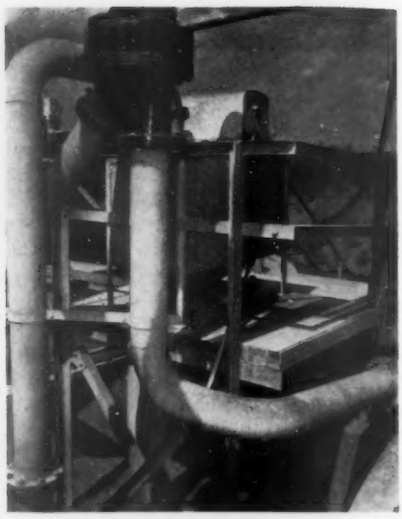


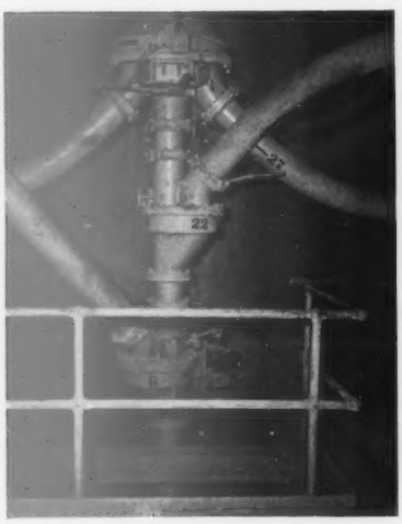
Diagram showing flow from thickeners to blending and kiln-feed tanks (Flow-sheet Number 1).



A view of the power house, cooling tower and storage silos.



Automatic slurry sampler between the sand and ore thickeners.

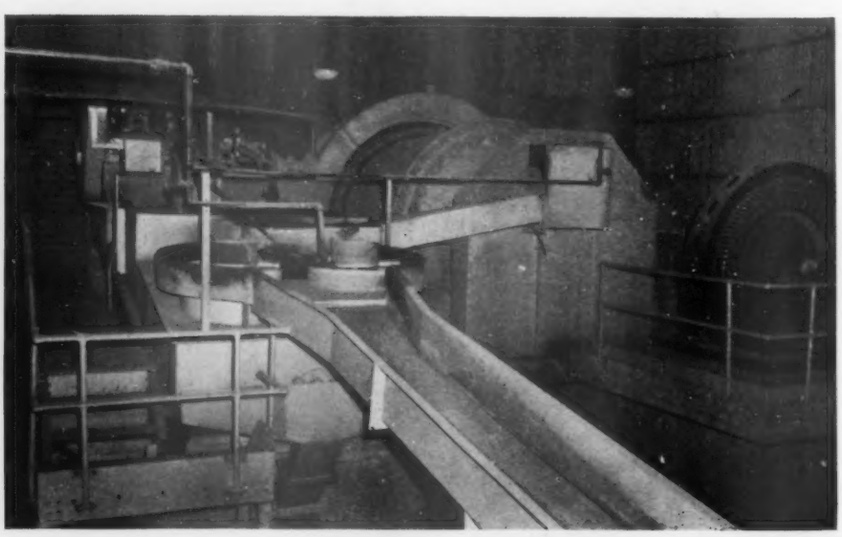


Some of the motor-operated valves on cement lines in gray-cement pack house.

One of the finish clinker mills with 16-foot separator immediately above.

This is one of the four direct-firing coal mills which fire the kilns.

Cell-feed turbo-mixer in flotation plant.



Preliminary raw-mill with part of classifier at left.

launder to the center of the bowl of the classifier, which is in closed circuit with the secondary raw-grinding mill. The particle size of this material is regulated by the speed of the rakes, the area of the outlet, and the amount of water used.

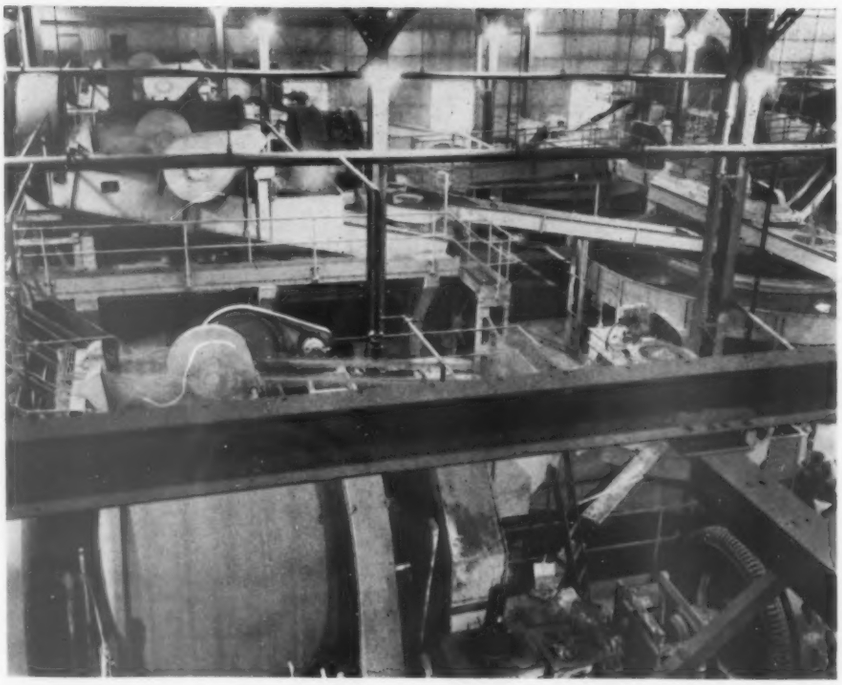
The secondary classifier is a heavy-duty machine with a 27-foot diameter bowl and a 16- by 40½-foot rake section. The bowl has rotating rake arms which move the coarse material, as it settles out, to the center of the bowl where it is discharged to four reciprocating rakes. As these rakes move the sand up the incline water sprays wash it free of the finer material.

The sand is discharged into a 15-foot diameter by 25-inch wide sand-wheel elevator which discharges it into the secondary raw-grinding mill. This is also a 9½- by 8 2/3-foot ball-mill and it is loaded with 60,000 pounds of 1¼- to ⅞-inch steel balls. It is also driven by a 350-horsepower synchronous motor. The stone slip is discharged from each mill back into the bowl of its classifier forming a closed circuit.

The finished slip overflowing the bowls of the two secondary classifiers in both systems contains from 13 to 15 per cent. solids. It flows into a common sump, from which a 10-inch centrifugal slurry pump forces the slurry about 1,000 feet to the cement-rock thickener which is on high ground above the plant. This pump has a rated capacity of 3,750 g.p.m.

Sand and Iron-Ore Grinding The iron ore and sand are fed by a weight meter from another bin to an 8- by 7 2/3-foot ball-mill. This is driven by a 200-horsepower synchronous motor and is loaded with 40,000 pounds of 1¼ to 2½-inch steel balls. This mill is in closed circuit with a 6- by 31½-foot heavy-duty classifier with a 10-foot diameter bowl. The iron or sand slip from the mill is picked up by an 8-foot diameter by 16-inch wide sand wheel from which it flows by gravity into the classifier bowl. The coarse material settled out in the bowl is carried up an incline by the rakes and discharged back into the mill. The fine slip overflowing the classifier bowl is forced by a 4-inch Nagle pump into either the sand or the iron-ore thickener on the hill near the cement-rock thickener.

The rock and sand thickeners with 100,000-gallon water tank in background.



Raw-grinding department with sand and ore mills in foreground, gray-cement mills and classifiers in rear.

All the five raw-grinding mills are automatically lubricated by a central-oiling system. This system, like those used in other departments, is complete with a storage-tank, filter, pump, etc., and the overflow from the bearings is returned to storage for re-use. Sight-feed valves are provided at all the bearings.

In this department there are three overhead traveling cranes of 12½-ton capacity—two of 42½ and the third of 37½-foot span. These cranes are used for handling machinery and repair parts, ball loads, mill liners, etc.

Raw-Material Blending In order to illustrate clearly and with simplicity what is actually accomplished in the way of processing and blending, a diagrammatic flow-sheet (flow-sheet number 1) is presented.

There are four types of raw materials upon which to draw and any proportion of each of these is available, within reason, on a moment's notice. They are:

1. Ground raw rock, not processed, contained in the 200-foot raw-rock thickener.
2. Processed flotation concentrates and centrifuge cake contained in the 200-foot concentrate thickener.
3. Sand, which is ground separately and is stored in the 50-foot sand thickener.
4. Iron, which is also ground separately and is stored in the 50-foot iron thickener.

An appropriate analysis of an average sample of each of these raw materials follows:

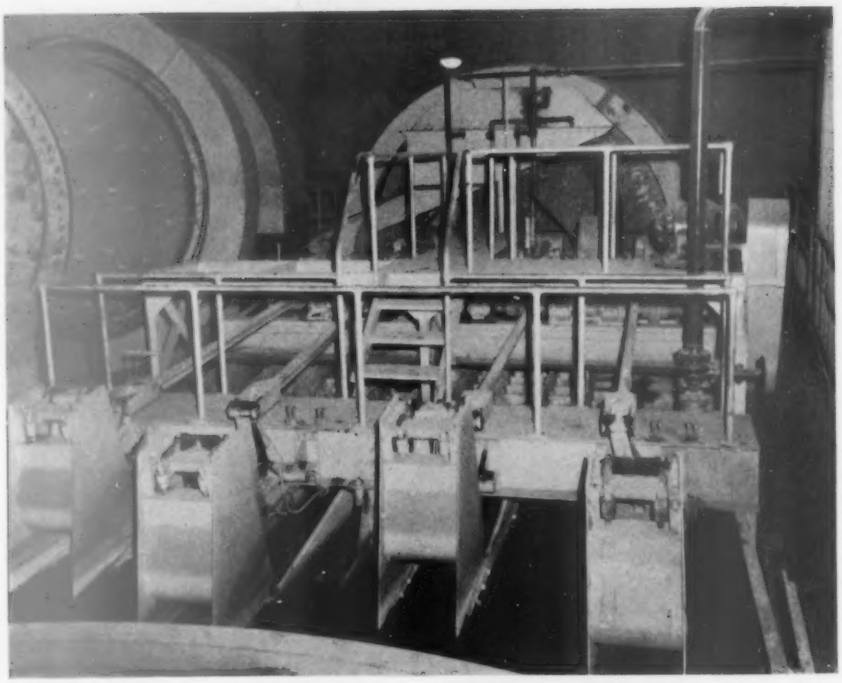
	Raw Rock Thknr.	Concentrate Thknr.	Sand Thknr.	Iron Thknr.
SiO_2	14.46	9.83	96.10	...
Al_2O_3	5.10	3.49	2.06	...
Fe_2O_3	1.78	1.63	1.22	105
$CaCO_3$	72.74	80.30	0.15	...
$MgCO_3$	4.80	3.70	...	...
SiO_2/R_2O_3	2.10	1.92	29.10	...

The table below gives the approximate percentage of each of these raw materials which is required to produce a few of the several different types of cement. It is apparent that these proportions can be changed at will.

	Rock	Processed Material	Sand	Iron
Moderate Heat	..	93.5	5.8	0.7
10 C_3A	20.3	75.7	3.4	0.6
High Early	..	96.9	3.1	..
15 C_3A	62.8	37.2	..	..

Both the raw-rock thickener and the concentrate thickener have a storage capacity equivalent to between 25,000 and 30,000 barrels of clinker each. The small sand and iron thickeners have a capacity of a few hundred tons each.

The eight blending tanks have a



Rake section of classifier in closed circuit with secondary raw-mill.

capacity of 1,500-barrels each, while the capacity of each of the two kiln-feed tanks is between 1,000 and 1,200 barrels.

Flotation Department In the following paragraphs is described the material flow with relation to the flotation of the cement-rock slurry. For a diagrammatic flow of the materials through the flotation plant reference is made to Flow-Sheet Number 2. A more detailed flow-sheet of the entire flotation and blending department is presented in flow-sheet number 3.

As pointed out, to continually produce a mix it is only necessary to maintain a tonnage in the four respective thickeners. It can be seen from this that the main object of the process plant is to maintain a sufficient quantity of high-lime slurry in the concentrate thickener. In a sense, and for the sake of clarity, the cell-house and concentrate thickener can be compared to a high-lime quarry, and it is only necessary to operate this plant to the extent of providing the high-lime materials.

One of six movable pumps beneath gray-cement silos.

All the limestone from the cement-rock quarry is ground in closed circuit to a fineness of approximately 92 per cent. minus 200-mesh. This material is all pumped to the 200-foot raw-rock thickener. This thickener is provided to make possible intermittent grinding in the raw department, as well as to thicken the slurry, which in many instances is used for blending in producing the various mixes. The slurry is also withdrawn from this thickener to the flotation plant in order to obtain high-lime concentrates.

Flow-sheet number 2 indicates that 100 per cent. of the raw material is being withdrawn from this thickener for flotation, and the percentage distribution of dry tonnage, as indicated, is that which would be used in the production of a high-silica-type cement. The capacity of the flotation plant has been designed to make possible continuous operation under this condition, and it is evident that when less difficult types of cement are being produced, the flotation plant need not be operated over considerable periods of time.

When the 200-foot thickener is full of high-lime material, the flotation plant can be shut down. The thickener then becomes a storage tank from which this high-lime material can be withdrawn until it is advisable to operate the flotation plant again.

The raw-rock slurry is withdrawn from the raw-rock thickener and pumped to the centrifuge-feed turbomixer by a 4-inch Nagle centrifugal slurry pump. At this point water is added to dilute the slurry. From the centrifuge turbomixer a 6-inch Nagle centrifugal pump conveys the pulp to a constant-level tank which feeds two 54-inch by 70-inch centrifuges. These machines are of the solid-bowl, continuous type, rotating at a speed of about 300 r.p.m. Each machine is driven by a 125-horsepower motor, through a variable-speed clutch with a speed range of 375 to 1,120 r.p.m. This clutch, in turn, drives the centrifuge through a V-belt drive.

Any variation in the size of the raw materials, or any variation in the size of the separation desired can be compensated for simply by increasing or decreasing the speed of these machines.

Weighing clinker and gypsum to elevator in one of three grinding circuits.

The function of the centrifuges in the operation of this process can best be described by stating that, in the processing of Lehigh Valley (Pennsylvania) argillaceous limestone, it is normally desired to raise the lime, lower the alumina, and retain the quartz. As the quartz and lime concentrate in the plus-30-micron fraction and the aluminum silicates in the minus-30-micron fraction, it has been found that by such a classification the plus-30-micron fraction becomes a product needing no further processing. Further, the aluminum silicates, which are the undesirable constituents of the rock, are by this means concentrated in the minus-30-micron fraction, and this in turn means that considerably less tonnage need be floated to eliminate these silicates.

The chief purpose of the centrifuge, therefore, is to convert a certain portion of the raw material into a centrifuge cake which has been increased in lime and silicon and lowered in alumina and alkalies to make it a satisfactory component of the final kiln feed.

The following table gives the chemical analyses of the products of the centrifuge, and illustrates very clearly its effect on the chemical composition.

	Feed	Cake	Effluent
SiO_2	14.44	13.52	15.32
Al_2O_3	5.42	3.46	7.29
Fe_2O_3	1.80	1.58	2.05
$CaCO_3$	72.45	76.70	68.14
$MgCO_3$	4.45	3.84	4.94
SiO_2/R_2O_3	2.00	2.68	1.64

A micron-size distribution of these products by cumulative weight percentages is listed in the following table:

Micron	Feed	Cake	Effluent
44	11.3	16.3	..
30	27.8	35.7	..
20	35.1	46.8	5.4
15	42.2	57.3	6.7
10	51.2	65.5	16.6
8	54.8	68.3	22.6
7	56.9	69.2	26.8
6	59.4	70.3	30.2
5	61.7	71.1	34.1
4	64.5	72.2	39.8
3	65.3	73.0	45.0
2	70.4	74.5	51.2

With a solids content in the centrifuge feed of 35 per cent. and in making a separation on a 50-50 dry-tonnage basis, the solids content of the centrifuge cake would be 73 per cent. and the effluent content approximately 23 per cent. The centrifuge cake is not processed further but is conveyed by means of a 20-inch ribbon-conveyor to a wash-mill, where it is mixed with the thickened concentrates and pumped to the blending tanks.

An alternative flow permits the cake to be conveyed into the concentrate launder in the cell-house, whence it flows directly into the concentrate thickener.

One of the 15-ton overhead cranes in the raw-storage building.

The effluent from the centrifuges flows by gravity into the cell-feed turbomixer, which is provided as a surge tank between the centrifuges and the flotation cells. There, also, any desired dilution changes can be made.

The pulp from the cell-feed turbomixer is forced by an 8-inch Nagle pump into a constant-head tank feeding the flotation cells, and from this tank the materials are withdrawn through four separate lines, one leading to each row of flotation cells.

The Fagergren flotation cells are installed in four rows of 18 cells each. Each row is an individual circuit so that it is possible to operate, as conditions may require, one, two, three or four circuits. These machines are driven in pairs, with each 15-horsepower motor driving two cells. Each is complete with reagent feeders.

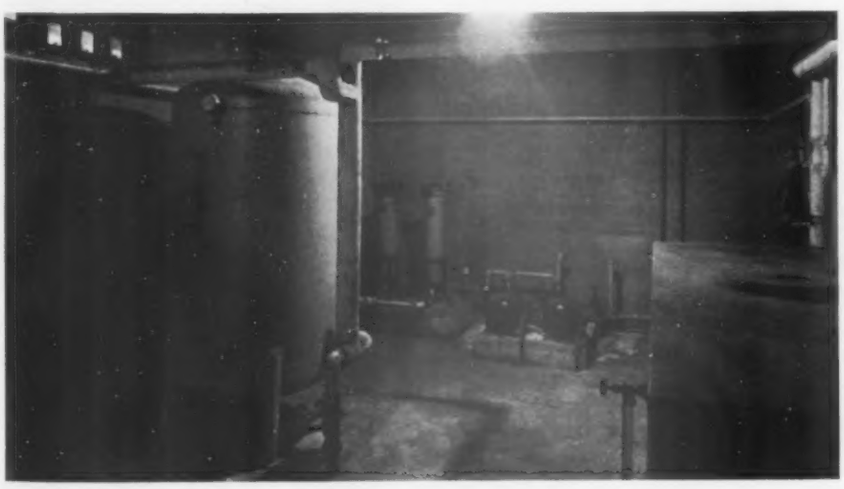
In operation a carbonaceous concentrate is taken off the first three cells in each row. This is relatively low in lime and quite high in micaceous and clay materials. The object of eliminating this material at this point is to facilitate the ensuing flotation of the lime, and to save on the consumption of reagent which would be absorbed by this carbonaceous material.

The next five cells are "rougher" cells, and the concentrate taken off there is high grade and flows by gravity into the thickener. Following these are six "scavenger" cells, the purpose of which is to recover as much of the lime as possible at a somewhat lower grade. This concentrate flows by gravity into four "cleaner" cells, in which this lower-grade product is further cleaned to produce good concentrates. The tailing from these cells is a middling which is returned individually to the first scavenger cell in each row. This is done by an individual 4-inch pump.

The final reject from the process plant, together with the carbon concentrate, flows by gravity out of the cell house and down to a reject dump provided for this purpose. The water reclaimed from this dump is pumped back into the process for further use. The tunnels through which the rejects flow to waste are ventilated by the Silent-Vane fans which are part of the ventilating system of the building.

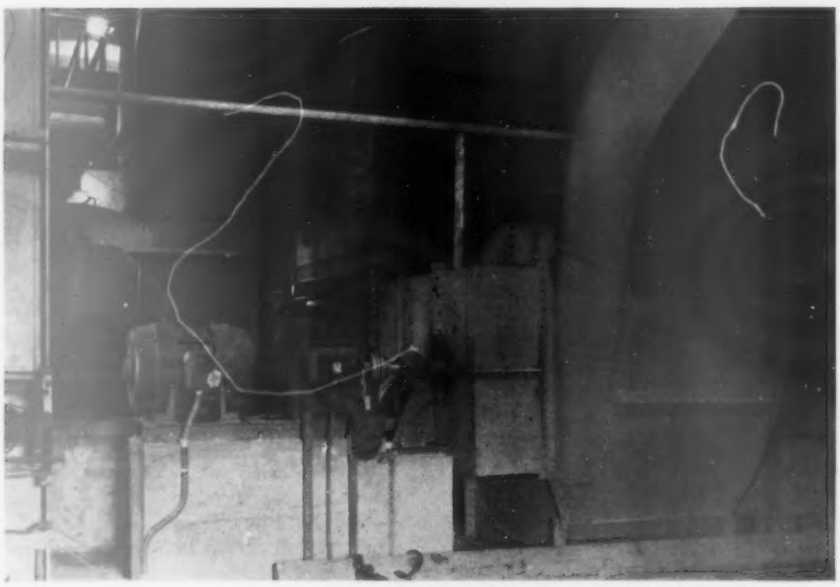
The final concentrates flow by gravity into the 200-foot concentrate thickener where they are dewatered. The overflow water from this thickener is returned to the water circuit of the flotation system by a 6-inch Nagle pump.

The underflow from the concentrate thickener, with the centrifuge cake, goes to a mixing tank from which the mixture is pumped to the blending tanks. It is from these tanks that the final kiln-feed slurry is blended. The discharge from these silos is regulated by diaphragm-

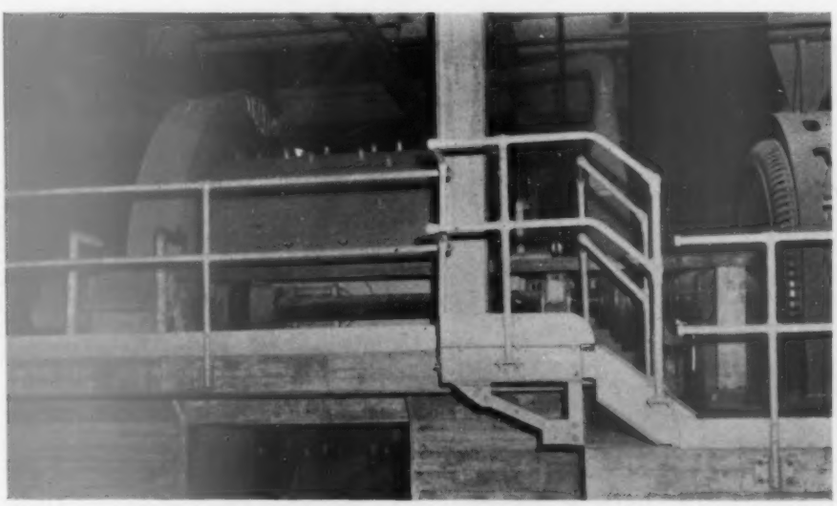


The "heart" of one of the automatic central-lubricating systems.

One of the three shaking-grate gray-clinker coolers as seen from the feed end.



Fans in the waste-heat boiler building.

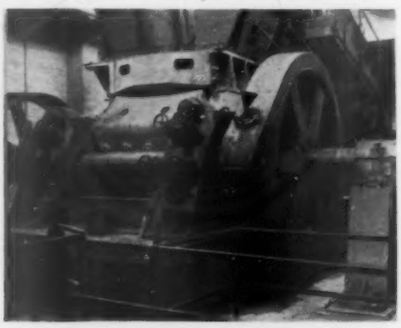


One of the three preliminary clinker-grinding mills.

Device which measures rock to one of the raw mills.

One of four conveyor weighing devices from which clinker is discharged to storage.

Panel of circuit breakers controlling raw mills.



Single-roll crusher in primary-crusher building.

One of the centrifuges in the flotation cell-house.

type motor-operated valves controlled from a board in the pump-house. The level of the slurry in the two sumps into which these tanks discharge is regulated by air-operated gages controlling four motor-operated slurry valves. The power for these motors is obtained from storage batteries in order to insure their functioning in case of a power failure.

From the sumps the slurry is pumped into the two 80-foot kiln-slurry storage tanks from which it is pumped into the kiln-feed tanks under the kilns.

Presented below are representative analyses of the flotation-plant products.

	Cell Feed	Concentrates	Rejects	Carbon
SiO_2	15.32	5.85	51.22	16.52
Al_2O_3	7.29	3.63	20.01	9.40
Fe_2O_3	2.05	1.68	3.11	5.18
$CaCo_3$	68.14	84.40	12.42	51.61
$MgCO_3$	4.94	2.70	9.21	4.94
SiO_2/R_2O_3	1.64	1.10	2.21	1.13

The grade of the concentrates can be materially increased. It has been found, however, that, for practical purposes and ease of operation, a concentrate of the above analysis is sufficiently high for the desired purposes.

The weight recoveries vary with the analysis of the rock from the quarry, the type of cement to be produced, and the analysis of the rejects. The lower the grade of the rock from the quarry the greater the amount of micaceous and siliceous material that must be discarded to produce a satisfactory lime material. For the production of the higher-silica-type cement the lime content must be high in order to provide for the addition of silica, as the rocks of the Lehigh Valley, generally speaking, do not contain sufficient quantities of free silica, uncombined with alumina, to produce these types. For the average analysis of limestone being used at this plant the weight recoveries will vary between 88 and 95 per cent., depending upon the type of cement to be produced.

Considerable thought has been given to the handling of the reagents throughout the process plant. The reagents, which are used in relatively large quantities, are received at the plant in tank cars and pumped to the flotation plant, where they are stored in two tanks. These tanks are fitted with heating coils to keep these reagents fluid during the cold weather. Facilities have been provided for withdrawing these reagents to turbomixers where they can be saponified or emulsified before being fed to the flotation cells. From these turbomixers the reagents are pumped to constant-head tanks which distribute the reagents to the various reagent feeders at the flotation machines.

These reagents which are used in smaller quantities are fed through Clarkson reagent feeders, while those that are diluted and used in larger quantities are fed through valves.

In laying out the cell-house considerable attention was given to the design of the house itself and the setting up of the equipment so as to facilitate operation by enabling the operator to get from one point to another.

The cells are set in concrete bins below the floor level with iron-grating walkways which span the cells and are supported on the concrete walkways that run longitudinally between the rows of machines. The concentrates coming off the cells drop into the concrete bins, the bottoms of which are sloped to facilitate the flow of the materials to their respective launders. The advantages of gravity flow have been utilized wherever possible.

Automatic samplers are used at the thickeners and at other critical control points to check the shift operations. These give a more accurate average sample than any

Looking down on the eight slurry-blending tanks.

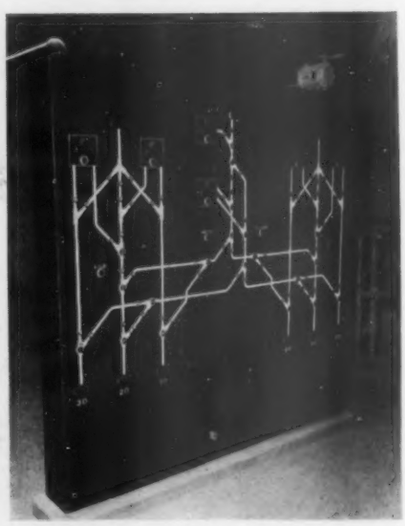
Two inclosed screens which scalp rock to secondary crusher.

which could be obtained manually. They were first used by the company at the Leeds, Alabama, plant. All handling of the slips and slurry is done by Nagle centrifugal pumps and, with a few exceptions, plug-type lubricated valves are used on all the slurry lines.

Burning and Cooling The finished slurry is drawn from the kiln-feed tanks by 3-inch pumps to the constant-level basins of the slurry filters above the feed ends of the four kilns. These are Eimco rotating-disk filters. Each of the two units over each of the three grey-cement kilns has nine disks 8 feet 10 inches in diameter which provide a total filtering area of 936 square feet per unit. The two filters over the white-cement kiln are identical except that each has only six disks.

The slurry entering the filters contains about 36 per cent. water and the filter cake contains about 23 per cent. The cake drops from each pair of filters into a hopper under which is a 24-inch by 16-foot pug-mill which also serves as a conveyor. This breaks up the cake, mixes it with the flue dust, and discharges it into hoppers over the four Pumpcrete machines which are used to feed the cake into the kilns. These are motor-driven plunger pumps which were originally designed to convey concrete through pipe-lines. They were selected for this plant because the extremely sticky nature of the filter cake made it difficult to handle by any other method. With this system also the kiln-feed pipe is kept full at all times, eliminating any infiltration of cold air into the kilns which might affect adversely the efficiency of the kiln or its waste-heat boiler. The 6-inch by 15-foot water-cooled discharge pipe leading to the kiln is horizontal and extends about 4 feet into the kiln. An interesting characteristic of this filter cake is the fact that it disintegrates readily in the presence of heat and creates no special ring problem in the kiln.

Three of the four kilns are 250 feet long and 10½ feet in diameter. The fourth kiln, which is used for white-cement manufacture, is 248 feet long and 9 feet in diameter. These kilns have all-welded shells



Board which automatically controls flow of cement through gray pack house.

with stiffening rings every 20 feet. Each kiln is carried on four box-type rings riding on solid forged rolls, which have water-cooled bronze bearings and are equipped with flood oil lubrication. Automatic and continuous lubrication is provided from a central-oiling system. An unusual feature in the construction of these kilns is the use of two manholes located directly opposite each other about 75 feet from the discharge end. Their function is to facilitate the handling of brick in and out of the kiln during a relining operation.

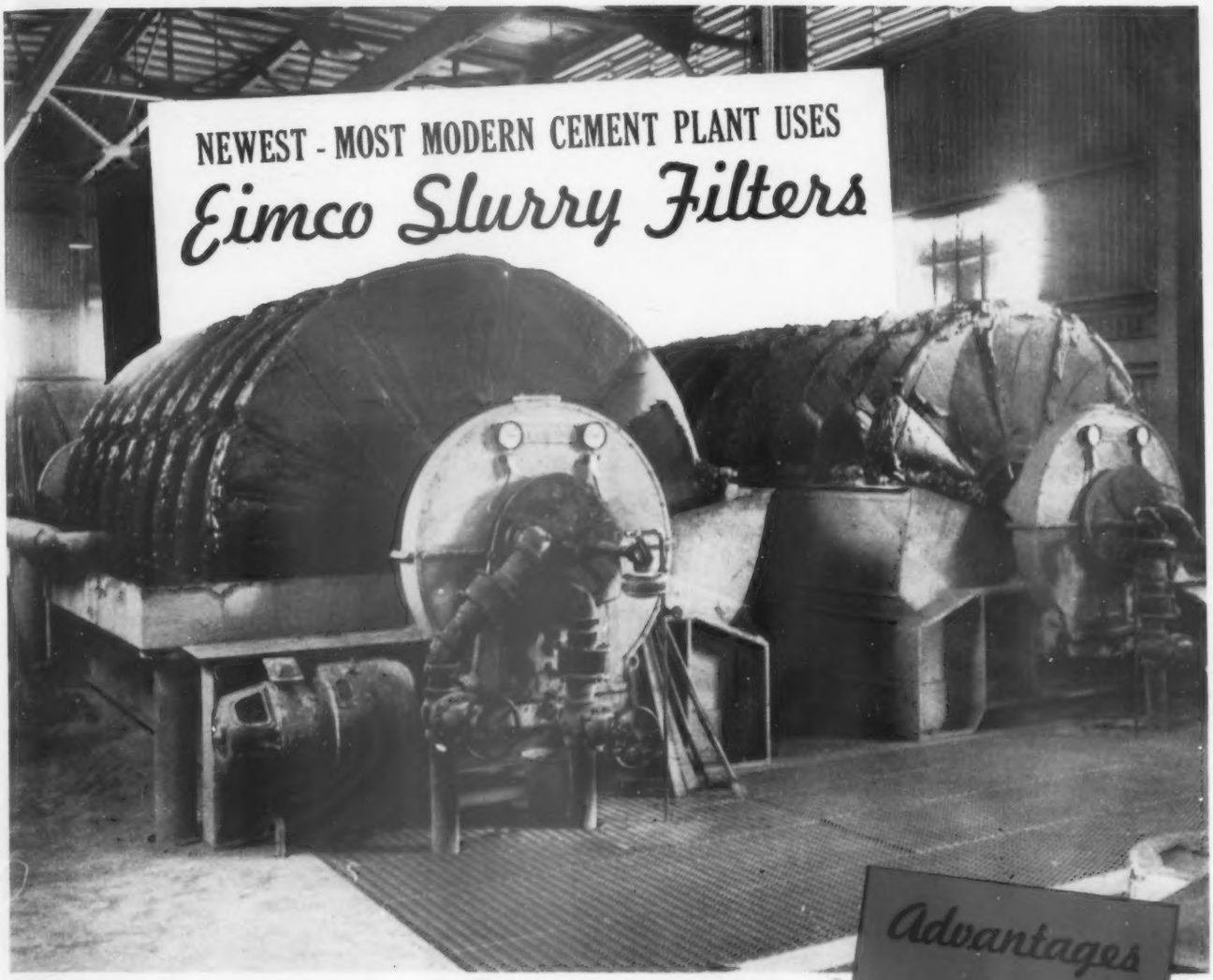
Each kiln has a pitch of ⅜ inch per foot and is driven through a gear reducer by a 125-horsepower adjustable-speed d.-c. motor. Electric control with 150-point rheostats makes possible perfect speed control between the limits of 10 and 100 revolutions per hour. The company's first use of this type of drive was at the Leeds, Alabama, plant where it has been very satisfactory. This drive involves the use of a d.-c. motor on the slurry feeder—in this

Motor and reducer drive of one of the four kilns.

case the Pumpcrete machines — which keeps it in constant speed with the kiln motor. The direct current for these drives is furnished by a pair of generators in the grinding-mill switchboard room. A small generator on each kiln motor shaft operates a tachometer on the kiln-control board.

The kiln lining, beginning at the firing end, consists of 8 feet of hard-burned brick, 64 feet of 6-inch high-alumina brick in the burning zone, 170 feet of 6-inch brick with 2½ inches of Superex insulation and 8 feet of Atlas Lumnite concrete lining at the feed end for resistance against both abrasion and heat.

The clinker from each of the three gray-cement kilns drops into



Eight Disc-type Eimco Vacuum Filters with a total filter area of approximately 7000 square feet were installed in one of the newest and most modern cement plants recently built and put into operation. Through its engineers and the cumulative experience of years of cement plant operation, the management was in position to design and build most efficiently; the selection of Eimco Filters for dewatering slurry was a compliment to Eimco.

Eimco Filtration engineers will service this installation and cooperate with plant management to the end that this newest, most modern addition to the cement industry shall fulfill all expectations.

Advantages

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1. Reduced fuel consumption.
2. Increased kiln capacity.
3. Improved control of raw material uniformity.
4. High waste heat boiler efficiency.
5. Increased grindability.

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A corner of the modern chemical laboratory.

One of the kiln-control boards.

The 195-foot main switchboard. Motor-generators, compressors, etc. at right.

a 4½- by 40-foot vibrating grate-type clinker cooler for which the cooling air is supplied by a 57,000 c.f.m. Sirocco fan. The clinker from the white-cement kiln drops into a 6- by 30-foot, two-compartment inclined grate cooler for which the cooling air is supplied by a fan. The hottest portion of the air from the feed end of each cooler is used as secondary combustion air for the kiln and the remainder is vented to the atmosphere through a stack. All the coolers are equipped with bed-depth, speed, air-weight and temperature controls. The clinker from each cooler drops into the boot of a bucket-elevator which discharges it on a 24-inch pivoted Weightometer which records the weight before the clinker is discharged into the clinker storage section of the large storage building.

When white cement is being made the clinker from the cooler is discharged from its Weightometer on a 24-inch belt-conveyor which carries it to the clinker-storage section of the small storage building.

Kiln Firing Each kiln is fired with pulverized coal by a direct-firing bowl mill which is automatically controlled for constant temperature in the kiln-feed pipe. The hot drying air for this mill is drawn from the top of the kiln hood and blown through the mill. The burning temperature in each kiln is also automatically recorded at from 2,400 to 2,600 degrees F. by a Ray-O-Tube aimed at the roof of the kiln. The Micromax temperature recorders and draft control, draft indicators, Stabilogs, and meters which control the operation of each kiln are mounted on attractive cell-type control boards inside which the most sensitive instruments are mounted for protection from dust.

Waste-Heat Boilers The exit-gas temperature of the three gray-cement kilns varies between 1,300 and 1,400 degrees F. but this is expected to be lowered to nearer the 1,200-degree temperature at which the waste-heat boilers are designed to operate. The hot exit gases from each of these kilns is drawn by a fan through a flue, a waste-heat boiler and an economizer before being exhausted through a common gas flue to the single kiln stack. The brick-lined, reinforced-concrete stack is 18 feet in interior diameter and 250 feet high. Space has been left for the installation of an electrical dust-precipitator at a later date.

Each of the three 1,500-horse-

SLY DUST CONTROL

Dominates IN THE CEMENT INDUSTRY— AND THROUGHOUT THE ROCK PRODUCTS FIELD

IN the cement mills of United States and Canada, also South America and Australia, there are more Sly Dust Filters, by far, than any other make (estimated at four times as many as the next most popular make).

These filters collect fine dust that would otherwise be scattered over everything and everybody. They protect workmen and eliminate dust wear on machinery bearings and gears.

Sly Dust Filters offer exclusive advantages: greater filtering capacity, power savings, automatic control, and savings in maintenance and operation. They soon repay their cost.

Write us fully so that we may analyze your problem and tell you exactly what can be accomplished.

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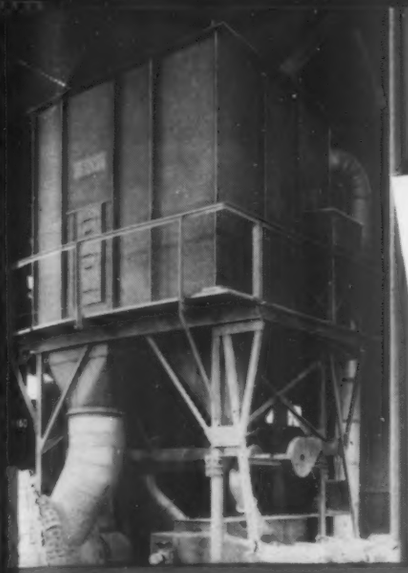
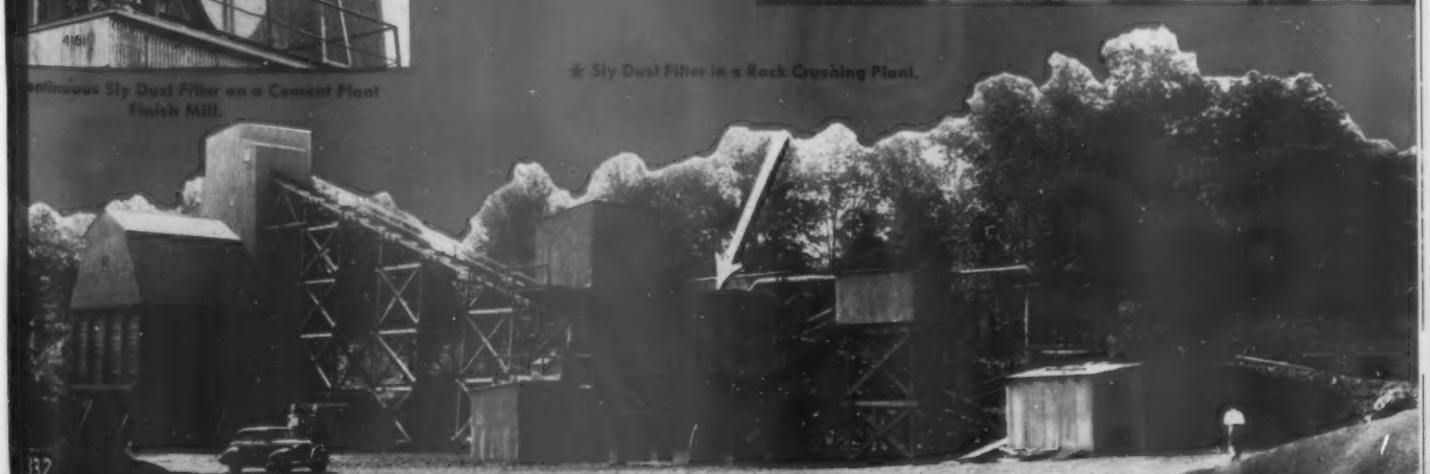


Sly Dust Filter in a Cement Plant Bag House

One of several Sly Dust Filters on a Cement Plant Pack House.

Continuous Sly Dust Filter on a Cement Plant Finish Mill.

★ Sly Dust Filter in a Feldspar Quarry and Mill.



★ Sly Dust Filter in a Rock Crushing Plant.

The cooler-drier on the white-cement kiln.

power, 3-drum waste-heat boilers is of the vertical-tube type and has 11,420 square feet of heating surface. Each has a 670-square foot superheater and a 4,420-square foot fuel economizer. Each unit produces steam at 275 pounds pressure and 150 degrees F. of superheat. The draft for the white-cement kiln is provided by a 57,000-c.f.m. induced-draft fan which exhausts direct to the stack.

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Auxiliary Boiler At the end of the white-cement kiln but not connected to it is an auxiliary Foster-Wheeler 1,510-horsepower stoker-fired, 3-drum, vertical-tube boiler with 11,420 square feet of heating surface. This has a 502-square foot superheater but no economizer and produces steam at 275 pounds pressure and 150 degrees F. of superheat. This boiler is fired with anthracite screenings by a 13-by 22-foot chain-grate stoker. The outlet gases from this boiler are sent to the same stack by a 51,000-c.f.m. induced-draft fan.

Flue-Dust Disposal The dust which settles in the flues leading to the waste-heat boilers and in the boilers themselves is collected in hoppers from which it is reclaimed by individual 9-inch screw-conveyors. These discharge the dust into a collecting cross screw-conveyor, and a bucket-elevator discharges it into a cross screw-conveyor from which individual screw-conveyors feed it into the three pug-mills previously mentioned. In these it is mixed with the slurry filter cake.

Pump which recirculates material through one of four rows of flotation cells.

The waste-gas flue leading to the stack also has a hopper bottom and the settled dust is fed by a screw-conveyor to a 5-inch Type H pumping system which disposes of it to waste.

White-Cement Kiln Operation Provision is made for the use of fuel oil instead of coal on the small kiln when white cement is being made, but coal low in sulphur and iron content can also be used if desired. The kiln hood is designed so that the coal-burner pipe can be readily disconnected and removed and an oil burner of the company's design installed in its place. This fuel oil is unloaded from tank cars into a main storage tank. There are two

day tanks from which the oil is pumped to the burner.

When producing white cement, the clinker is first quenched and then delivered to the first section of a 2-compartment cooler which is connected to this kiln and is used for drying the clinker by heated air. Some reduction in temperature takes place here, but the principal and final cooling is effected in the second, or cooling, section of the cooler.

One of the two 4-tube packers in operation.

The cooling air is taken from the atmosphere by a fan rated at 18,000 c.f.m. The drying air is obtained from a recuperator at the back end of the kiln from which some of the hot air leaving this kiln is blown through the drying section of the cooler by an 18,800-c.f.m. fan. When the machine is being used as a cooler, both fans work together supplying cold air.

Clinker Grinding The gray-cement clinker-grinding building is located adjacent to the storage building and contains three separate and complete grinding systems, each consisting of a preliminary and a finish-grinding mill. The clinker and gypsum are fed from bins into the three 9½- by 8⅔-foot Preliminators by separate Feedoweights which are interconnected to provide a constant feed at a predetermined rate. A bucket-elevator discharges the blended mixture into each mill. Each mill is loaded with 53,000 pounds of 1½- to 3-inch steel balls and is driven by a 400-horsepower synchronous motor.

The product of each mill is discharged by a bucket-elevator into an 8- by 30-foot two-compartment Ball-Peb mill for finish grinding. These mills are lined with rolled-steel plates and each carries a total load of 85,000 pounds of ¾- to 1-inch steel balls. Each mill is driven by an 800-horsepower synchronous motor. The discharge from each mill goes to a screw-conveyor, which discharges it into a bucket-elevator and then to a screw-conveyor with opposed flights from which it is discharged into two 16-foot mechanical separators lined with wearing plates. A 16-inch screw-conveyor feeds the rejects or coarse product of each pair of separators either back into the Preliminator or into the feed end of the Ball-Peb mill.

The fine material or finished cement is collected from each pair of separators by one of three 16-inch opposed - flight screw - conveyors. These three conveyors discharge at their midpoints to an 18-inch collecting screw-conveyor from which the cement is discharged into a small hopper over an 8-inch Type H cement pump. This pump delivers the cement through a 10-inch pipe line to the tops of the gray-cement storage silos, a distance of about 720 feet.

Each of the three grinding circuits in this department is connected to a separate dust-collecting system. These are 7,390-c.f.m., automatic continuous collectors connected to several points on each grinding circuit. All the mills in this department are automatically lubricated by a central-oiling system.

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From Raw Rock

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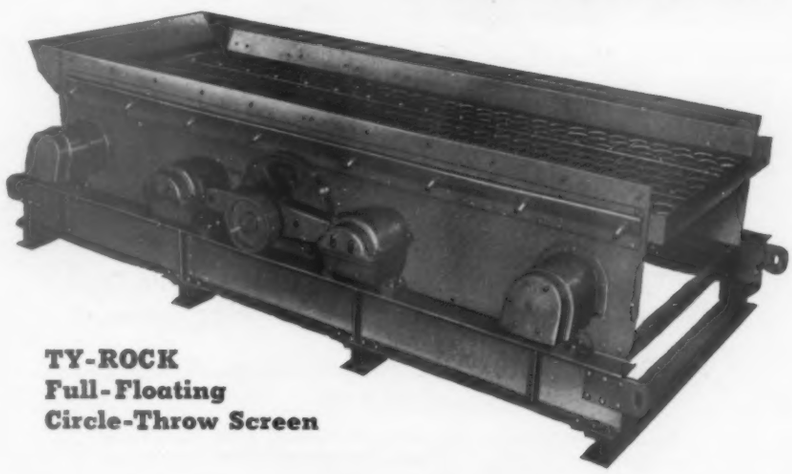

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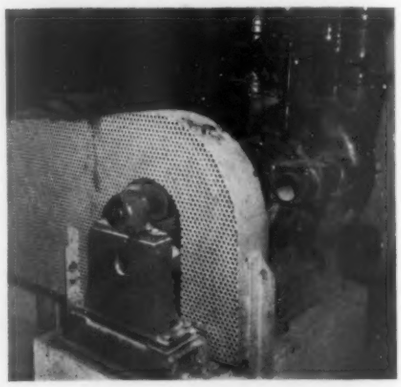
Cement Storing, Reclaiming and Packing

The gray cement is discharged from the 10-inch cement-pump line into the silos through valves. The gray-cement storage consists of two groups of fifteen 26-foot diameter by 110-foot high reinforced-concrete silos. The silos in each group are arranged in three parallel rows and each group has eight interstitial bins. The bottoms of the silos are steel hoppers mounted on concrete columns and are self-cleaning. The Universal Atlas company was one of the first to use this type of construction.

Under each of the six rows of silos there is a 7-inch Type H, cement pump mounted on a steel truck. This pump can be moved on rails to withdraw cement from any one of the silos in its row and from any of the adjoining rows of interstices. Withdrawal of the cement from the silos is controlled by rotary valves.

These pumps discharge the cement through 8-inch lines into the cyclones of the four bag-packing systems in the gray-cement packhouse which is centrally located between the two groups of silos. These lines can also feed the cement to one of the three packers now installed in the white-cement packhouse or to the bulk-cement car-loading building. These lines are completely equipped with remote-controlled, motor-operated valves which are operated automatically from a control board on the packing floor.

The packers are Modern 4-tube bag-filling and weighing machines which automatically remove excess air from and deflate the loaded bags before discharging them. This sequence of operations is controlled by electronic timers and considerably reduces the dust loss caused by the loading and handling of the bag. The filled bags from each pair of machines drop on a reversible wire-mesh belt-conveyor which can discharge them at either side of the pack-house. At each end of the conveyors is a V-shaped loading table so that two hand trucks can be loaded simultaneously. There is just enough space at each end of the conveyor for the trucks to be moved for loading into the cars.



Slurry pump in basement of flotation pump house.

In the circuit for each packer there is a Hum-mer screen over the bin from which the cement is discharged through a rotary feeder to a screw-conveyor from which it is discharged to the packer hopper. This hopper is kept full at all times and the overflow is returned to the bin by a bucket-elevator which also receives the spillage from the bag conveyors.

Each of the four packing circuits in this building is connected to a three-tier, 5,940-c.f.m. dust-collector. This is connected to the packer, elevator, belt-conveyor, etc.

The bulk-cement loading is done in a separate building. The cement is discharged from the pump lines into bins from which it is discharged through motor-operated valves and rubber spouts into the cars. The bins are equipped with

MERRICK SCALES SERVE NEW CEMENT PLANT

←*Installation of one of several Weightometers used on clinker and coal.*

Write for Data Books on Weightometer and Feedoweight. Many pages of factual data—technical drawings, photos, detailed parts, conveyor arrangements, specifications . . . all the information you need to determine the applicability of Merrick equipment in your plant. Copies sent promptly on request.

Thumb nail description of Automatic Weighing and Feeding of Cement ingredients at Northampton, Pa., plant of Universal Atlas Cement Co.

WEIGHTOMETER	. . . To weigh all raw rock into plant.
FEEDOWEIGHTS	. . . To weigh and feed rock, sand and iron ore to primary mills.
WEIGHTOMETER	. . . To weigh coal to kiln bins.
WEIGHTOMETERS	. . . To weigh clinker output of kilns.
FEEDOWEIGHTS	. . . To proportion clinker and gypsum.

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Engineers and Manufacturers of Automatic Weighing Equipment

PASSAIC, NEW JERSEY, U. S. A.

automatic top-level controls.

A 1,500-c.f.m. dust-collector removes the dust from the air released from the pumping system. The cars stand on a 150-ton track scale while being loaded. The scale is also used for weighing bulk-cement cars which are loaded through chutes in the side of each of the outside rows of silos.

White-Cement Plant The clay and the limestone used in manufacture of white cement are received in cars, the former from a company-owned deposit, and are discharged from a trestle in the storage building which is used for white-cement raw materials and clinker. All the handling of these materials is done by a 10-ton traveling crane with a 4-cubic yard clamshell bucket and an 80-foot span.

The clay is discharged by the crane into a hopper from which it is fed by gravity into a 26-foot-diameter wash mill. A bucket-elevator discharges the clay slip over two Hum-mer screens. The rejects from the screens are discharged by gravity into a 7- by 8-foot ball-mill. The clay slip from this mill is discharged into a sump from which a 4-inch Nagle pump feeds it back over the Hum-mer screens.

The fine clay slip passing through these screens goes into another sump from which a 3-inch pump forces it

Motor and reducer driving conveyor Number 1 from primary crusher.

to either of the two 24-foot-diameter blending tanks in the white-cement flow. The clay is blended from these two tanks into one of four 30-foot-diameter blending tanks. The blended slip is pumped from this tank by a 3-inch Nagle pump into the feed launder of the rock bowl classifier where a clay feeder insures the proper proportions.

The stone is discharged from storage into a hopper from which it is fed by an electric vibrating feeder into a 10- by 24-inch jaw crusher. A bucket-elevator discharges the

Amsco-Nagle Pumps Are *Engineered for Cement Mill Service*

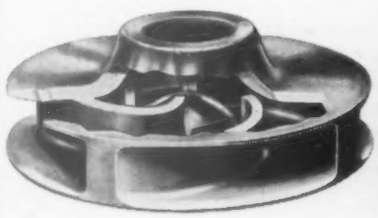
The slurries handled in the production of portland cement, ranging from thin mixtures to concentrations which will hardly flow, have a peculiarly destructive effect on water end parts. This attack can best be described as erosive, in contrast to the abrasive abuse received by pumps handling heavier and coarser materials. Localized wear, due to eddy currents, is apt to be the cause of rapid attrition. This scouring action can be reduced by specialized design and in that effort Amsco engineers have been successful.

For the elimination of the severe wear caused by eddy currents, the Amsco-Nagle Class "S" impeller (U. S. Patent 2,265,448) shown below, has been developed. The clearances between the impeller and the sides of the pump have been increased, to establish a more balanced relationship between the respective designs of impeller and casing, and to reduce skin friction and its attendant energy loss. A reduction in the horsepower used per gallon or pound of material pumped results.

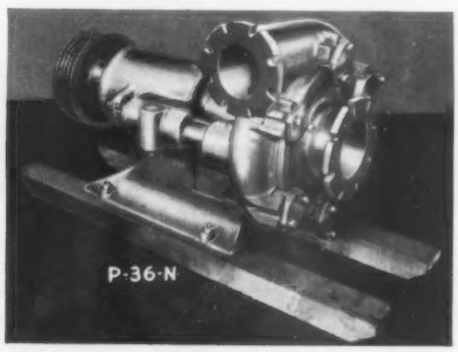
All clearances converge and diverge gradually, and there are no sharp angles in the clearance areas. Quick changes in velocity or direction are thus avoided. Eddy currents are minimized or eliminated.

In Amsco-Nagle pumps for slurry handling, the elimination of gland trouble and the selection of resistant material for the water end are also given proper attention.

Ask for Bulletin 940 on Amsco-Nagle pumps and 1043-CM on Manganese Steel for cement mill equipment.



P-36-N. 4" Type "T", frame 19 pump. The new Northampton plant of the Universal Atlas Cement Company uses 35 Amsco-Nagle pumps, from 3" to 10" in size, for all raw materials handling; slurry, clay and stone slip.



Amsco
AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Illinois
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stone into a small storage hopper from which a 24-inch Feedoweight discharges it into an 8- by 7-foot ball-mill.

The stone slip from the mill flows into a 20- by 39-foot bowl classifier with a 25-foot diameter bowl. The rake product of the classifier is returned to the mill by a 15-foot diameter wheel elevator.

The classifier overflow is transferred by a 6-inch Nagle pump to the 100-foot-diameter thickener.

The blended stone and clay slip underflow from the thickener is fed by a 3-inch Nagle pump to any of or all the remaining three 30-foot blending tanks. Any additional clay needed may be added at these tanks. A 5-inch Nagle pump feeds the finished white-cement slurry from these tanks to either of the two feed tanks under the white-cement kiln.

The white-cement kiln and the manner in which it is used for the production of either white or gray cement has already been described.

The white cement clinker and gypsum are fed by the crane from storage to separate hoppers from which 24-inch Feedoweights proportion them into an 8- by 7-foot ball-mill. A screw-conveyor and an elevator in series feed the product of this mill to an 8- by 26-foot Ball-Peb mill used for finish grinding. This mill operates in closed circuit with a 16-foot-diameter mechanical separator from which rejects are returned to the mill by a screw-conveyor and elevator. This grinding circuit is connected to a dust-collector rated at 4,488 c.f.m.

Both the raw and finish grinding mills in this plant are automatically lubricated by a central-oiling system.

The finished white cement is discharged from the separator into a 5-inch Type H cement - conveyor system which transfers it a distance of 750 feet to the white-cement storage through a 5-inch line. This consists of two rows of seven silos each with six interstices and is similar in design to the gray-cement storage. These silos are 20 feet in diameter and 78 feet high. Under each of the two rows of silos is a 7-inch movable pump, and a control board controls the discharge of this cement to various points by means of remote-controlled motor-operated valves.

The white-cement packing station at present has only one packing system which is identical in design to the one in the gray-cement pack-house. It consists of a cement bin, Hum-mer screen, rotary feeder and

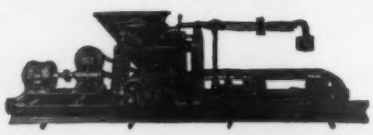
Reversible hammer-mill used for secondary crushing.

a 4-tube Modern bag-packer. It has the other features already described and is connected in the same manner to a dust-collector.

As previously mentioned, this packing system can also be used for gray cement and there are provisions for packing either gray or white cement in barrels for export. Mechanical barrel-packers are used.

The white-cement pack-house is

Over One Thousand



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With **SPEED ECONOMY PRECISION**

In hundreds of plants throughout the world the Schaffer Poidometer has displaced the old rule-of-thumb method of proportioning raw and finished materials.

In every instance the change has resulted in greater production, assured uniformity of product and important economy. Schaffer Poidometers are built to stand hard, continuous service. The increased tempo caused by the war emergency has further emphasized their ability to take it.

But even so, it will pay you especially during this period of high pressure production to check over your Poidometer occasionally and keep it in good condition.

Poidometers can be furnished with recording devices for registering total tonnage handled. Also with remote controls for indicating rate of feed, total amount delivered, and for changing rate of feed.

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Device which weighs stone on conveyor Number 3 to storage building.

between the white-cement silos and the two-story building used for sack cleaning and storage for both plants. A platform elevator serves the two floors of the building. The sacks are trucked from the second floor of this building through a passageway over the loading tracks separating the white and gray-cement pack-houses. The bags are dropped to each packer through chutes.

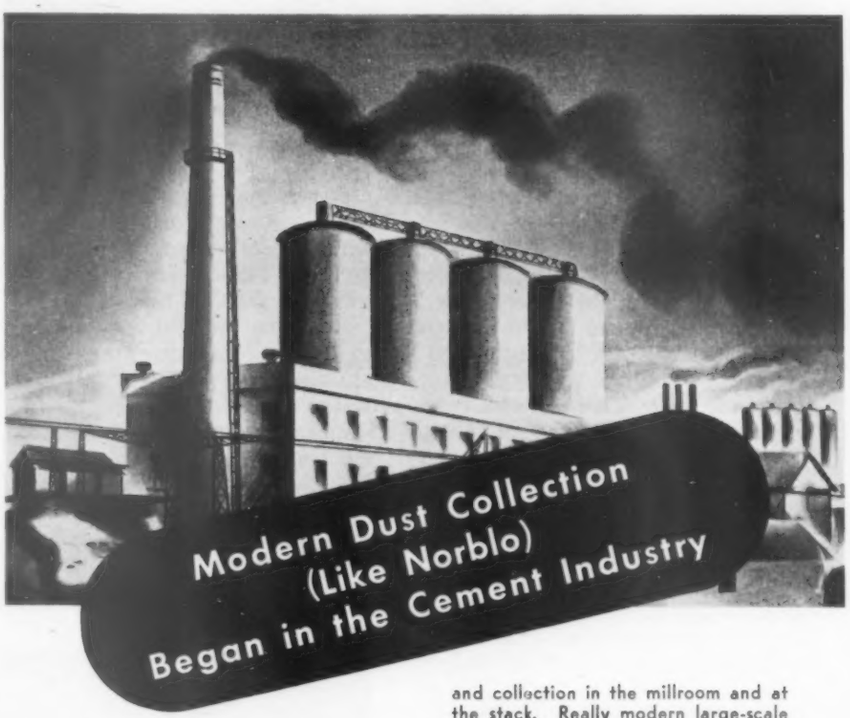
Another elevator in the latter building is used to carry men and materials to the various floors of this building and to the tops of the silos.

Power and Water Supply The electric power for this plant will be produced by two turbogenerators rated at 5,000 kilowatts with 80-per cent. power factor and 6,250 kilowatts at 100-per cent. power factor with 250-pound steam at 150 degrees F. superheat and 27½- vacuum. Only one of these generators is now installed and it is supplemented temporarily with purchased power. This generator produces 3-phase, 60-cycle, 2,300-volt current and is driven at 3,600 r.p.m. by a direct-connected steam turbine. Beneath the turbine is a 2-pass surface condenser which provides the necessary vacuum. The condenser is 84 inches in diameter, 16 feet long and has 690 square feet of surface area. It is equipped with the necessary steam-jet air pumps and has pumps for returning the condensate to the boilers.

All the fresh water for this plant is obtained from Hokendaqua Creek which runs near the power-house and is dammed at a point below it. This water is withdrawn from the creek through a channel under the cooling tower into a well under the power-house. The intake channel is provided with a movable screen. Two 12,000-g.p.m. low-head turbine-type pumps withdraw the condensing water from this well. Three pumps—two electric-motor — and one steam-turbine-driven, feed the mill-service water from this well through horizontal pressure filters to a storage tank which is located on a hill near the flotation department.

Three 4,000-g.p.m. low-head turbine-type pumps feed the cooling water discharged from the condensers from a second well under the power-house to a 10,000-g.p.m. 6-section, induced-draft type cooling tower. The tower is housed in a 26- by 120-foot architectural concrete shell 30 feet high. Excellent drinking water is purchased from the borough of Northampton and numerous electric water coolers are scattered throughout the plant.

Power Distribution All the power generated is transmitted through 2,300-volt feeder lines to the mill electric substation. This is a 225-foot by 40-foot reinforced concrete building located adjacent to the raw- and clinker-grinding departments. It contains the numerous panel boards required



• Some historian of the future may think it worth while to inquire why the cement industry has received so little credit for its genuine inventiveness. It was the first large-scale manufacture employing continuous production methods and continuous materials control. It was the first large-scale chemical synthesis and is still the largest. So cement was the first big industry to modernize.

One of the thorniest problems in cement manufacture is dust control and collection in the millroom and at the stack. Really modern large-scale dust collection had its origin in this industry. For many years Norblo engineers have "lived with" the cement industry with the result that cement plant installations account for a larger percentage of Norblo equipment than all other industries combined. Some Norblo equipment has gone into nearly every recent model plant in the primary producing areas.

If your present system is not giving results that satisfy you let a Norblo engineer look it over and suggest a war-time solution.

Norblo
DUST COLLECTION
THE NORTHERN BLOWER COMPANY
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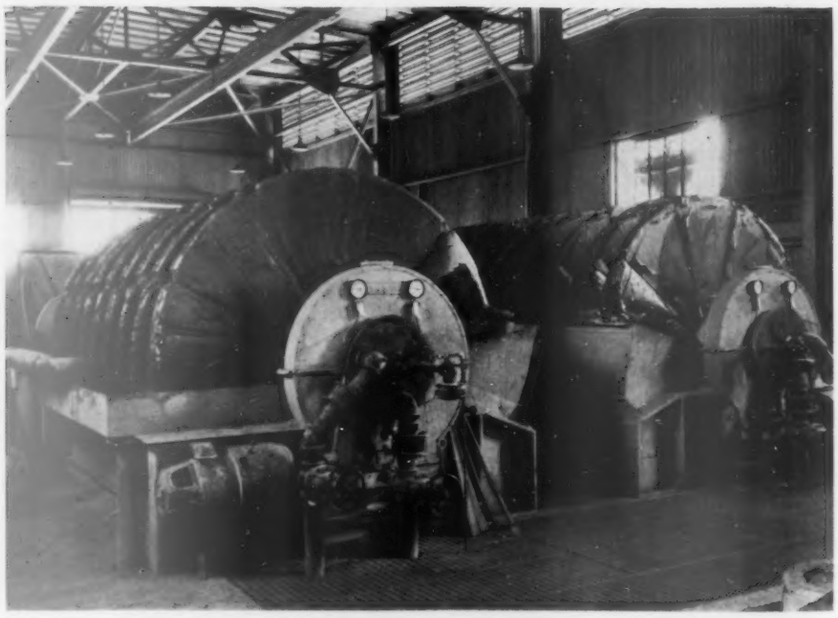


Pair of slurry filters over one of the four kilns.

to distribute power to all parts of the plant. The synchronous motors which drive the raw mills and those which drive the clinker mills operate on 2,300-volt current and are controlled directly from control boards located in the sub-station. All the other motors in the plant operate on 440-volt current from eleven transformer banks located at convenient points to which current is transmitted, through underground cables, from the sub-station at 2,300 volts.

The wiring to the various switches on the boards which control motors on auxiliary machinery in the grinding mills are so interlocked that it is impossible to start any motor out of its proper sequence and the failure of any motor will automatically stop all the motors in the same grinding circuit. This room also houses the d.-c. generators for the kiln drives, the two compressors and two 250-horsepower d.-c. motor-generators which provide power for the traveling cranes, etc.

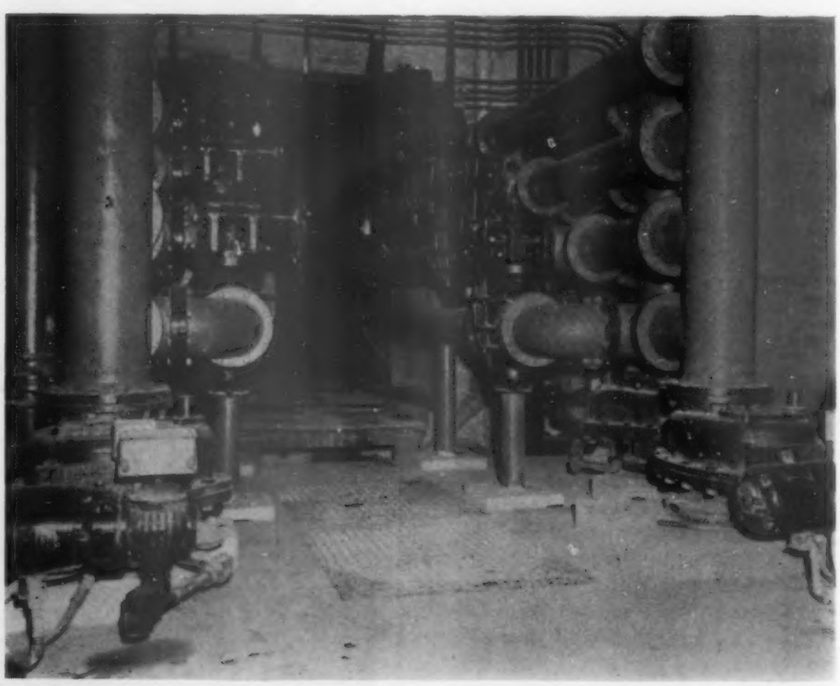
Electrical Data In general all 440-volt motors are remote-controlled through modified circuit breakers used as motor starters. These are grouped in their respective departments. They have features of both magnetic contactors and circuit breakers and are expected to be more economical in the long run than the equipment ordinarily used for this purpose. The use of this type of starter is said to eliminate blow-out delays and the dangers inherent in the usual switches and fuses.

It has been found possible to operate the power system at near-unity power factor due to the designed use of synchronous motors with 80 per cent. leading power factor. These motors are so distributed that a near-unity power factor can be obtained not only under full load but also when operating at only partial capacity.

An apparently large excess of installed power is due in part to the usual safety factor and also in part to the fact that many stand-by units, such as pumps, generators, compressors, etc., would not be in use. It is also partly due to the fact that the motor sizes are standardized as much as possible in order to reduce the inventory of motors and parts which must be kept in stock. The motor sizes used in this plant are 1, 3, 5, 10, 15, 20, 30, 40 and more horsepower. Flexible couplings are used on most drives.

An interesting feature is the use on the synchronous-motor mill drives of an inching device to turn the mill manholes up for ball loading. Standard electric-welding motor-generator sets located at various points in the mill buildings supply sufficient current to turn these motors at 3 r. p. m. instead of their usual 180 r. p. m. The ratio of reduction between each motor and mill is 10 to 1. These are S A E 400 sets rated at 37 amperes full load and using 440-volt, 3-phase, 60-cycle current. They can also be used as welders to supplement the several portable sets used in this plant.

Accurate speed control of some of the equipment is obtained by means of magnetic couplings. The two centrifuges and the pug-mills feeding the slurry filter-cake pumps are driven through eddy-current-type magnetic couplings in order to obtain adjustable speed with constant-speed squirrel-cage motors instead of the usual variable-speed d.-c. motors. These couplings have centrifugal-type governing devices which make it possible to maintain a predetermined speed. The draft fans have electro-magnetic type couplings. These have no governors



Tunnel from pump-house basement showing wheel- and motor-operated valves on slurry lines.

and consist of synchronous motors with variable-speed drives.

A prospective addition is a gasoline- or Diesel-engine-driven emergency generator to provide current for driving the kilns, service-water pumps, etc., in case of a power failure.

Air-Compressors Typical of the attention to detail which is one of the features of this plant is the manner in which the compressors are located as close as possible to the main point of utilization of the air. Fourteen rotary air-compressors and vacuum pumps are located in various parts of the plant. These supply air at 50 pounds pressure or less for various departments and operations. A rotary compressor in the flotation department pump-house supplies the air used for agitation in the slurry-blending tanks and for other purposes in this department. A rotary compressor on the filter floor supplies the air used for slurry agitation in the kiln-feed tanks. Four rotary vacuum pumps supply the vacuum necessary for the withdrawal of moisture from the filter cake in this department. A rotary compressor supplies the air for the flue-dust pump. A rotary air-compressor supplies air for the 10-inch pump which conveys finished gray cement to the storage silos. Another pump serves the same purpose in the white-cement clinker grinding department. Four rotary compressors in the basement of the gray-cement pack-house supply the air for the six pumps under the silos and for other purposes in this department. A rotary compressor in the white-cement pack-house does the same work in that department. These compressors are all equipped with lubricators and intake filters.

Two 18- by 11- by 14-inch horizontal compressors in the main switchboard room supply air at 100 pounds pressure for use in the quarry and in various plant departments.

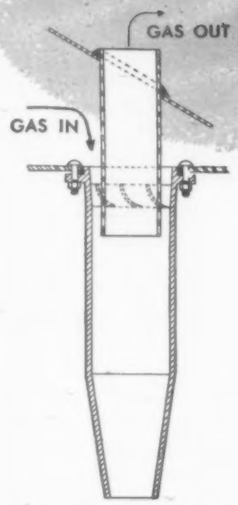
Coal Storing and Conveying The slack coal used to fire the kilns is discharged from cars into a track hopper from which a belt-conveyor feeds it to a bucket-elevator. A split chute makes it possible to send the coal either to the kiln mills or to storage. In the latter case the coal is discharged to a second bucket-elevator discharging into a screw-conveyor on the top of the three reinforced-concrete coal-storage silos. Coal is discharged from the hopper bottom of these silos back on the belt-conveyor from the track hopper.

Under the silos there is also an Airveyor conveying system which feeds coal a distance of about 600 feet through a pipe-line to a bin over the stoker which fires the auxiliary boiler.

The coal for the kiln mills is discharged from the first elevator to a 24-inch pivoted Weightometer from which it is distributed by a screw-conveyor to feed hoppers over the four coal mills. A fan and cyclone connected to the coal elevators keep this department clean.

Miscellaneous The machine shop and storeroom is a one-story reinforced-concrete building 220 feet long by 60 feet wide with a monitor roof for ventilation and light. A 10-ton crane of 30 foot span covers the middle bay for the entire length of the building. Adjoining the south end of this building is a one-story 50-foot by 100-foot reinforced-concrete structure which provides ample room for lockers, wash fountains, shower baths, etc., for all the employees. It also contains a first-aid room, together with offices for employment and welfare and the mill-department heads.

THE MULTICLONE IS Simple!



Cross-section of the MULTICLONE *Tube*

Equipment for the collection of dusts and other suspended particles from gases should be simple in design and operation to insure sustained recovery efficiency. The MULTICLONE offers these important advantages...

ITS CLEANING action is unusually simple and positive. The gas is whirled in a rugged cast iron separating tube where it is centrifugally cleansed of *fine* as well as coarse suspensions. There are no screens or filters to require frequent cleaning or replacement . . . no high speed moving parts to repair or maintain . . . nothing inflammable for hot gases to burn!

The recovered suspensions are completely discharged from the collecting tube as quickly as they are separated from the gas. Therefore, collected dust particles do not choke or restrict gas passages after continued service, enabling the MULTICLONE to maintain the same high recovery efficiency throughout years of heavy duty operation!

The Multiclone is the product of 36 years research and development in suspension recovery, starting with the first commercial application of Cottrell Electrical Precipitation. Our experienced engineering department will gladly offer helpful suggestions on the solution of your recovery problem!

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Recent Shifts in World Trade Channels of Phosphate Rock

Before the onset of World War II international trade in phosphate rock was well established in certain definite channels, this commodity moving largely from three major producing centers—North Africa, the United States, and Oceania—to three principal consuming areas—Europe Japan, and Australia and New Zealand. Two of the producing areas—North Africa and Oceania—exported practically all their production; that from North Africa going principally to Europe but some to Japan, and that from Oceania being split between Japan and the British colonies of Australia and New Zealand. The other important producing area, the United States, shipped only its surplus (about a third of its production). This went chiefly to Europe and Japan. Of the various consuming areas Europe was almost entirely dependent upon imports, as was also Australia and New Zealand. Japan was largely dependent upon foreign sources, whereas the United States alone was entirely independent in respect to external supplies.

These normal world trade relations in phosphate rock have been almost completely upset by the war's developments. Each of the major developments has reacted on international trade in this commodity. The outbreak of the war between the allied nations of England and France and the German Reich on September 3, 1939, with the consequent British blockade of Germany, brought to a complete stop all exports of American and North African rock to Germany and the territory it controlled in central Europe —Austria, Czechoslovakia, Danzig, and Poland—except those which may have entered through the neutral Mediterranean countries in southeastern Europe.

With the invasion of Norway by Germany in April, 1940, phosphate-rock shipments to the Scandinavian countries from the United States ceased, and in May, 1940, the German invasions of Holland and Belgium ended all possibility of further shipments to those countries.

The defeat of France, in June, 1940, had many repercussions in world phosphate-rock trade. It stopped the movement to Britain and the Union of South Africa from the North African deposits, normally the principal source of supply for this material, with the result that Great Britain turned to the United States for supplies, and exports of American rock to Great Britain in 1940 exceeded even the large amount sent from the United States to Japan in that year. Large shipments were also made in 1940 from the United States to the Union of South Africa, which normally obtained its requirements from Morocco. Record shipments went also to Canada from the United States, and American rock was sent to Portugal for the first time in many years. As a result of these new demands exports from America were maintained at about 70 per cent. of the pre-war volume.

The entrance of Italy into the war as an Axis partner, following the collapse of France, stopped the shipments of American phosphate rock not only to Italy but also to those countries, such as Switzerland and Hungary, which had been receiving American phosphates through Italian ports. The defeat of France and the entry of Italy into the war also had a very adverse effect on the phosphate industry of the French possessions in North Africa—Algeria, Morocco, and Tunisia—countries which normally produce about 4,000,000 tons of rock a year and export about 3,500,000 tons to Europe. Shipments from French North Africa in 1940 and exports to Europe in that year are stated to have been only about 50 per cent. of those of 1939. Shipments were chiefly to France, Italy, and Spain.

On September 20, 1940, Japan invaded Indo-China, and seven days later, September 27, 1940, joined the Berlin-Rome Axis, resulting in the cutting off of shipments of phosphate rock to Japan by Britain from Egypt, Nauru and Ocean Islands, and Christmas Island.

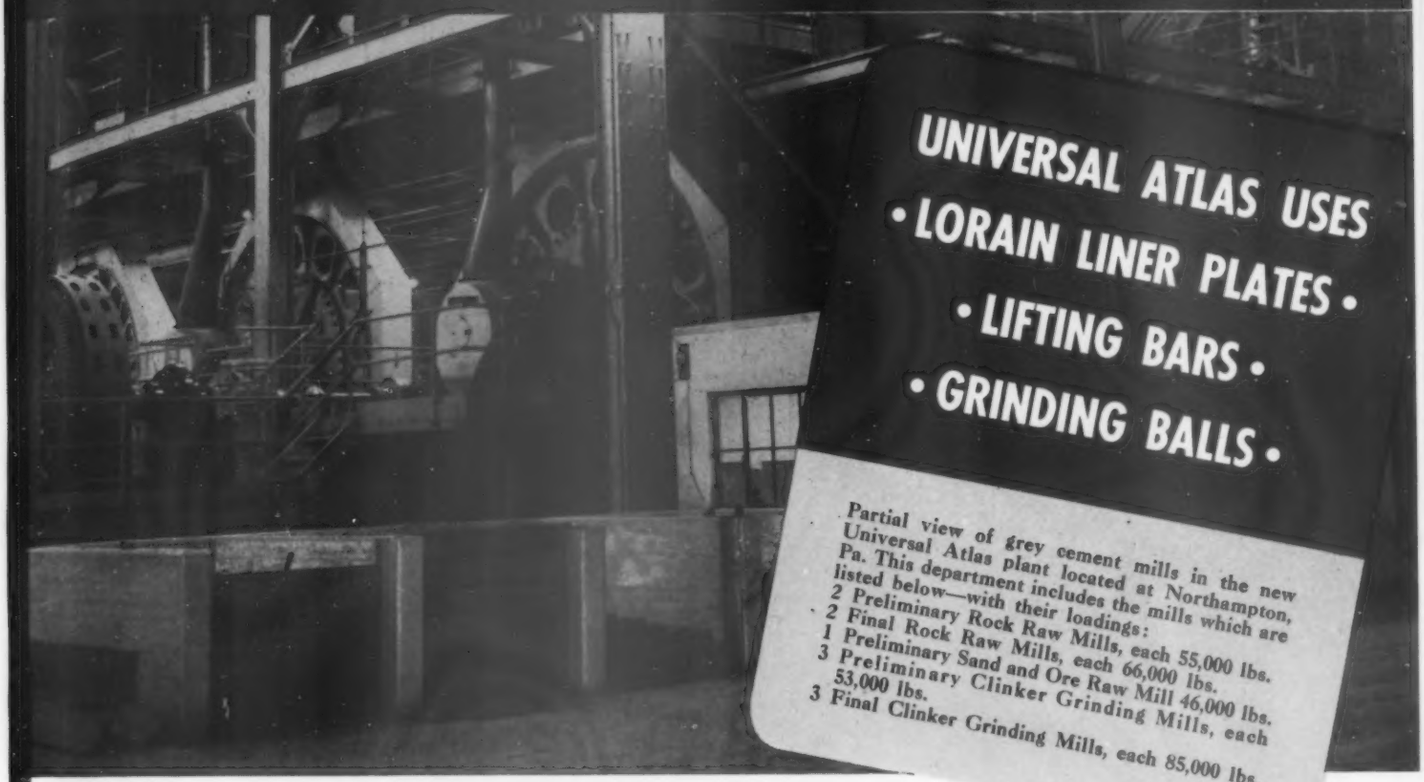
In 1941 two further major interferences in world trade in phosphate rock occurred. The first was the German attack on Soviet Russia in June, 1941, thereby cutting off imports of Russian apatite into Germany, and initiating a movement of the Kola Peninsula apatite from the port of Murmansk to Britain and the United States. The second was the surprise attack on Pearl Harbor in the Hawaiian Islands on December 7, 1941, bringing the United States into the war on the side of Britain, and resulting in the cessation of shipments from the United States to Japan.

Early in 1942 Japan conquered most of the phosphate-producing islands of Oceania (Nauru, Ocean, and Christmas Islands), making herself self-contained in this commodity and fully compensating herself for her loss of imports from the United States, Egypt, and French possessions. This move by Japan also largely cut off the supplies to the British colonies of Australia and New Zealand, which had come principally from Nauru and Ocean Islands.

The world phosphate trade picture changed again in November, 1942, the Bureau of Mines points out, with the United Nations' occupation of the phosphate-bearing areas of French North Africa in Algeria, Morocco, and Tunisia, and the German occupation of the former "unoccupied" portion of France. These events stopped the supplies of North African phosphates going to France, Italy, and Germany, and cut off the entire continental European market except the neutral coastal countries of Spain and Portugal, thus throwing the entire North African production on the remaining vastly restricted world markets in Allied and neutral countries in direct competition with American phosphate rock, and also raising the possibility of an invasion of the American domestic market by the French North African phosphate. The British Isles can now again get their supplies from French North Africa, releasing space on ships traveling from the United States to Britain, and possibly eliminating much of the American export trade in this material. Australia and New Zealand, long cut off from their former sources of supply in Nauru and Ocean Islands, can now be supplied from North African sources.

Thus, at the beginning of 1943 Japan alone of the Axis powers stood self-sufficient in phosphate rock, whereas the European members have been cut off from the U.S.S.R. and all extra-European sources of supply and are limited to small controlled European deposits apparently inadequate for their economy. The Allied nations, on the other hand, have at their disposal the great phosphate resources and industries of the United States and French North Africa, a supply far in excess of the needs of both allied and neutral nations of the world.

Setting Grinding Standards



UNIVERSAL ATLAS USES
• LORAIN LINER PLATES •
• LIFTING BARS •
• GRINDING BALLS •

Partial view of grey cement mills in the new Universal Atlas plant located at Northampton, Pa. This department includes the mills which are listed below—with their loadings:
2 Preliminary Rock Raw Mills, each 55,000 lbs.
2 Final Rock Raw Mills, each 66,000 lbs.
1 Preliminary Sand and Ore Raw Mill 46,000 lbs.
3 Preliminary Clinker Grinding Mills, each 53,000 lbs.
3 Final Clinker Grinding Mills, each 85,000 lbs.

THE great new Universal Atlas Cement Company plant at Northampton, Pa. incorporates all the latest proved features of design, operation and equipment, sets a new standard of efficiency.

Thousands of tons of limestone, silica sand, clay and iron ore must be powdered to almost talcum fineness. After processing, the resulting clinker, with gypsum added, must be ground even finer to produce the finished cement. All of this grinding is done in mills lined with Lorain steel liners, with Lorain lifting bars and Lorain grinding balls of various sizes.

In these great grinding mills, liner plates and lifting bars must have outstanding qualifications in order to play their vital part in maintaining efficiency and economy records. In these and other mills all over the country, on all grinding jobs, Lorain is helping to increase production, save time, cut costs.

In hundreds of installations, U·S·S Lorain Rolled Steel Plate Lining is standard equipment. Reorders come through automatically as replacements are needed. This rugged, durable lining is adaptable to your mills, of whatever diameter or length, in whatever thickness is required.

If you will let us know the kind of grinding you do and the type of mill you use, we shall be glad to suggest U·S·S Lorain Rolled Steel Plate Linings to meet the conditions. Will you write us today for complete information? It's free.

Showing how Lorain lining plates, 2" thick, and lifting bars are assembled for use in the new Universal Atlas plant. Note that the lifting bar not only wedges between plates, but also clamps them down.

U·S·S Lorain Grinding Balls are especially made for the industry to the most exacting specifications of hardness, toughness and roundness. Use them to make better, more economical grinding doubly sure.

LORAIN ROLLED STEEL PLATE LINING
LORAIN GRINDING BALLS

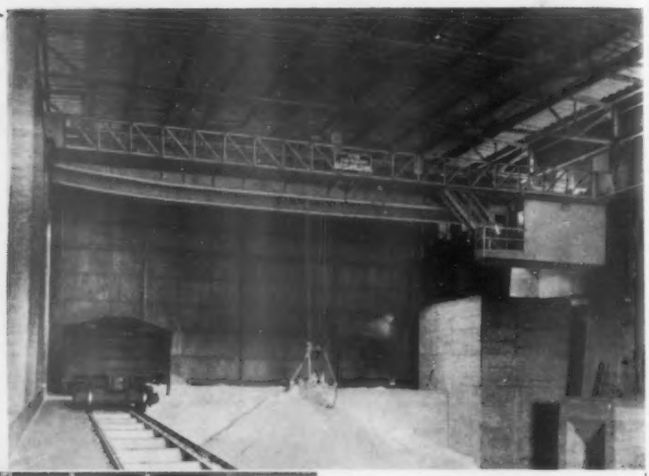
CARNEGIE-ILLINOIS STEEL CORPORATION

Johnstown Lorain Works · Johnstown, Pa.

Columbia Steel Company, San Francisco, *Pacific Coast Distributors*
United States Steel Export Company, New York

UNITED STATES STEEL

CLEVELAND CRANES SERVE NEW UNIVERSAL ATLAS CEMENT MILL



Two 15-ton (5 cu. yd.), 100'-0" span bucket cranes (photo at left) serve the Gray Cement Rock and Clinker Storage. A 7½ ton (2 cu. yd.) 80'-0" span bucket crane (photo above) serves the White Cement Rock & Clinker Storage.

The Rock and Clinker Storage for both the Gray Cement and White Cement Mills at the new Universal Atlas Cement Co., plant in Northampton, Pa., are served by all-welded Cleveland Cranes.

These cranes are especially advantageous for this service because they are designed to be as completely protected from the fine swirling dust as possible. Those parts that cannot be completely enclosed are extra heavily constructed with plenty of wearing surface. Of tremendous importance in assuring long operating life is the all-welded construction. Even the girders are so fabricated. This seals them and prevents entry of the abrasive dust.

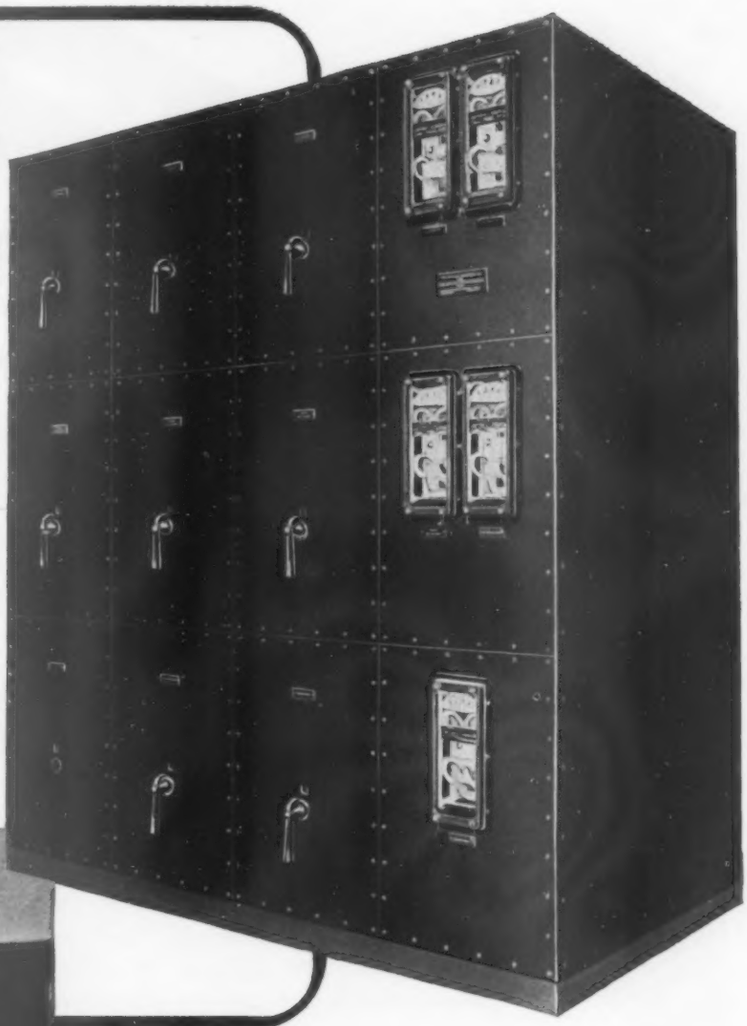
An outstanding feature is the air-conditioned units with which each is provided to supply clean dust-free air to both operator's and control compartments.

Like the fine mill in which they are serving, these Cleveland Cranes are modern in design, construction, and appearance.

THE CLEVELAND CRANE & ENGINEERING CO.

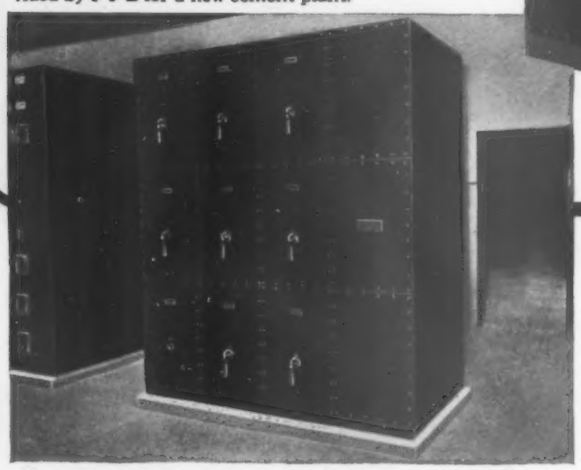
WICKLIFFE OHIO

I-T-E MULTUMITE SWITCHGEAR IN *Cement Plants*



Right:
Switchboard housing eight air circuit breakers for 440-volt service in a new cement plant. This board is one of twenty-five designed and built by I-T-E for one project. The photograph shows the board assembled at the I-T-E factory prior to shipment as a complete unit ready for installation.

Below:
Installed view of one of twenty-five switchboards provided by I-T-E for a new cement plant.



I-T-E switchgear for cement-plant service offers an example of the adaptability of I-T-E designs to purchasers' requirements. The boards illustrated above are standard with respect to the circuit breakers, their bus connections, their auxiliary wiring and the framework of the structure. Enclosed buses, however, are especially designed to operate with low temperature rise in keeping with conditions peculiar to the service. Special provision has been made, also, to keep penetration of dust at a minimum by gasketing all doors and panels and fastening them with closely-spaced machine screws. Finish, as always on I-T-E switchgear, is durable.

Standard I-T-E practices for design and construction of air switchgear are identified and illustrated in Bulletins 4207 (Drawout) and 4208 (Stationary). At your request, we shall promptly send copies to you, and our engineers will be glad to talk with you about adaptions to meet the requirements of your plant.

I-T-E **AIR SWITCHGEAR**
IMMERSED IN AIR • ENCASED IN STEEL
Representatives in Principal Cities
CIRCUIT BREAKER CO., PHILADELPHIA, PA.

Convert to Coal

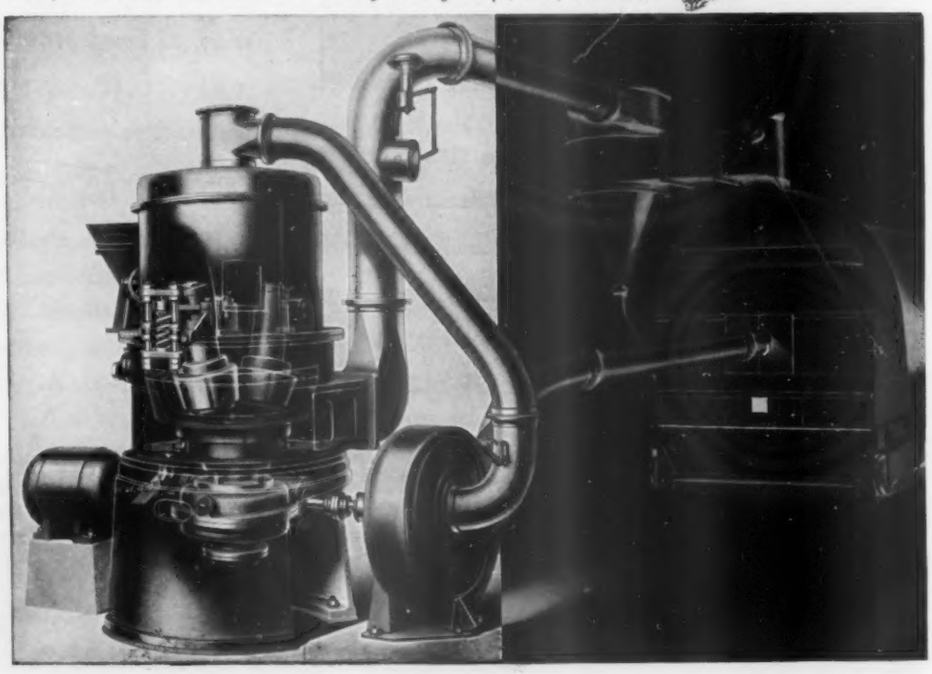
. . . with the Raymond BOWL MILL for direct-firing your rotary kilns and industrial furnaces . . . thus leaving the critical fuels, natural gas and oil, for urgent military needs.

You will be well repaid in the extra economies you gain, plus the advantages of thermostatic control, minimum supervision, and easy adjustability while running.

For cement, lime, dolomite and magnesite kilns, use the BOWL MILL to cut costs, increase firing efficiency and improve kiln production.

RAYMOND BOWL MILL

RAYMOND PULVERIZER DIVISION
COMBUSTION ENGINEERING COMPANY, INC.
1321 North Branch Street Chicago 22, Illinois
Sales Offices in Principal Cities. Canada: Combustion Engineering Corp., Ltd., Montreal



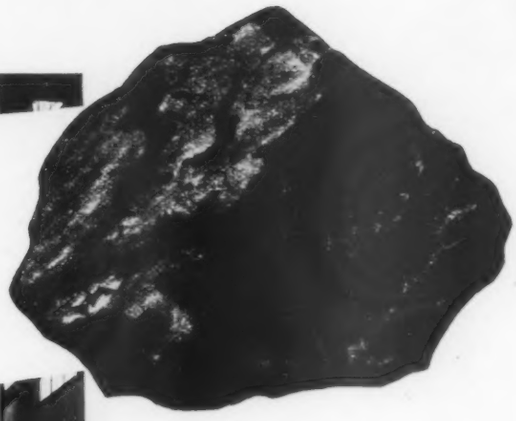
RAYMOND BOWL MILL

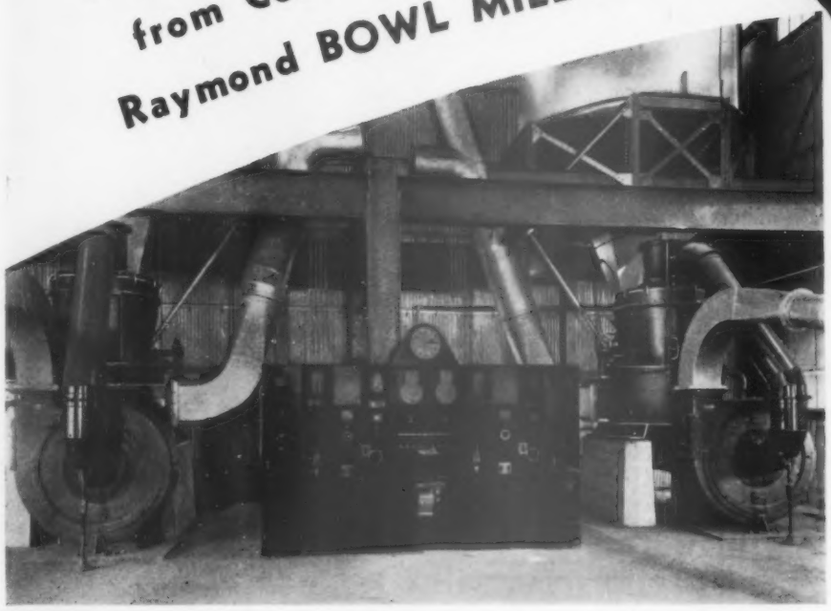
Handles any grade or moisture coal

Noiseless, vibrationless, dustless operation

Write for Catalog No. 43

Insure Maximum Efficiency
from Coal and Kiln with
Raymond BOWL MILL Firing





Write for
Raymond Bowl Mill
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Typical of hundreds
of Installations
now in Successful
Operation.

RAYMOND
BOWL MILLS
DIRECT FIRING
ROTARY KILNS

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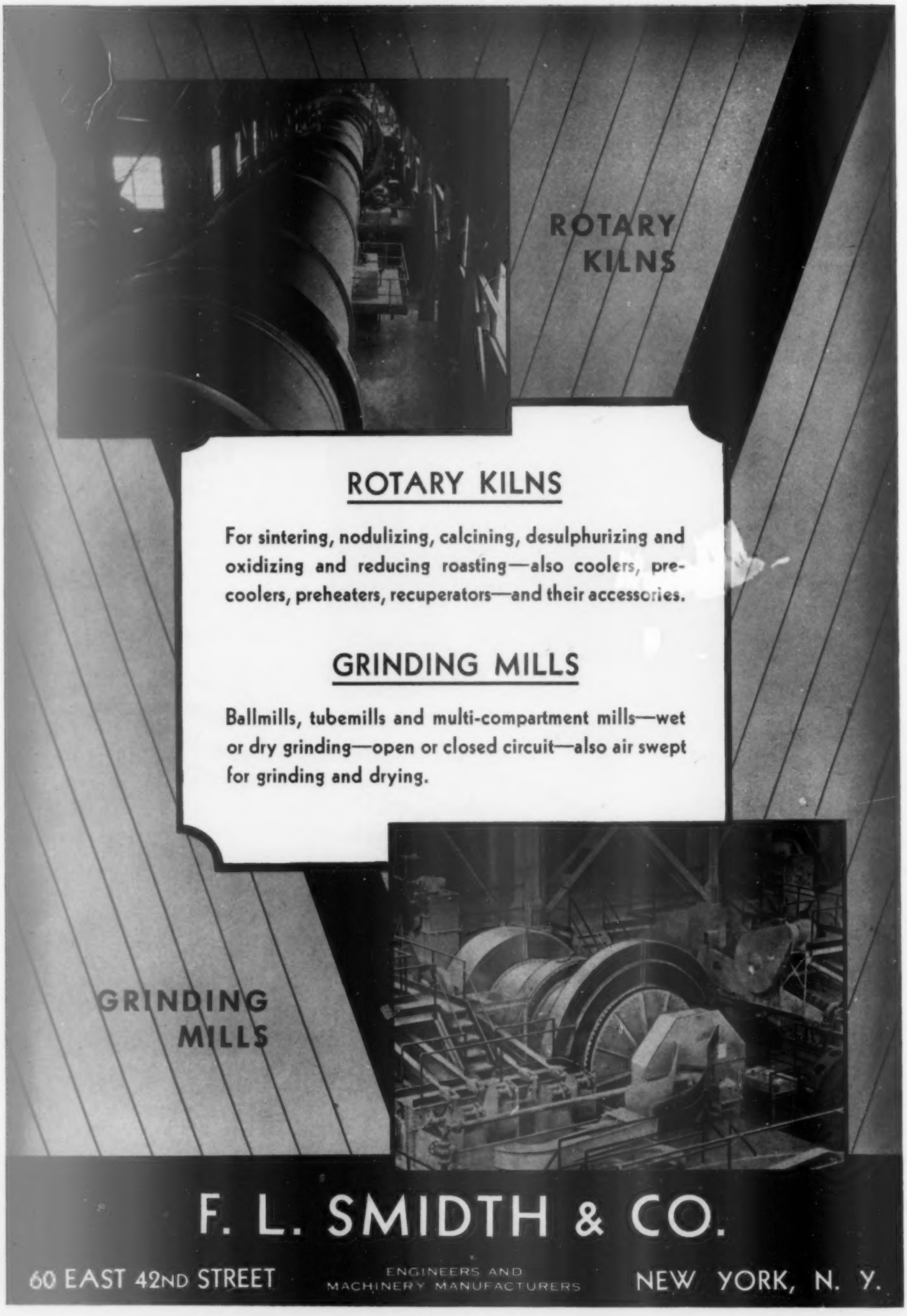

ROTARY KILNS
ROTARY KILNS
For sintering, nodulizing, calcining, desulphurizing and oxidizing and reducing roasting—also coolers, pre-coolers, preheaters, recuperators—and their accessories.
GRINDING MILLS
Ballmills, tubemills and multi-compartment mills—wet or dry grinding—open or closed circuit—also air swept for grinding and drying.
GRINDING MILLS
F. L. SMIDTH & CO.
60 EAST 42ND STREET
ENGINEERS AND MACHINERY MANUFACTURERS
NEW YORK, N. Y.

Right: Nugent oiling system on one of the four giant rotary kilns at the Universal Atlas plant. Nugent Sight Feed Oilers are made with removable sight glasses for cleaning without stopping the continuous oil flow.

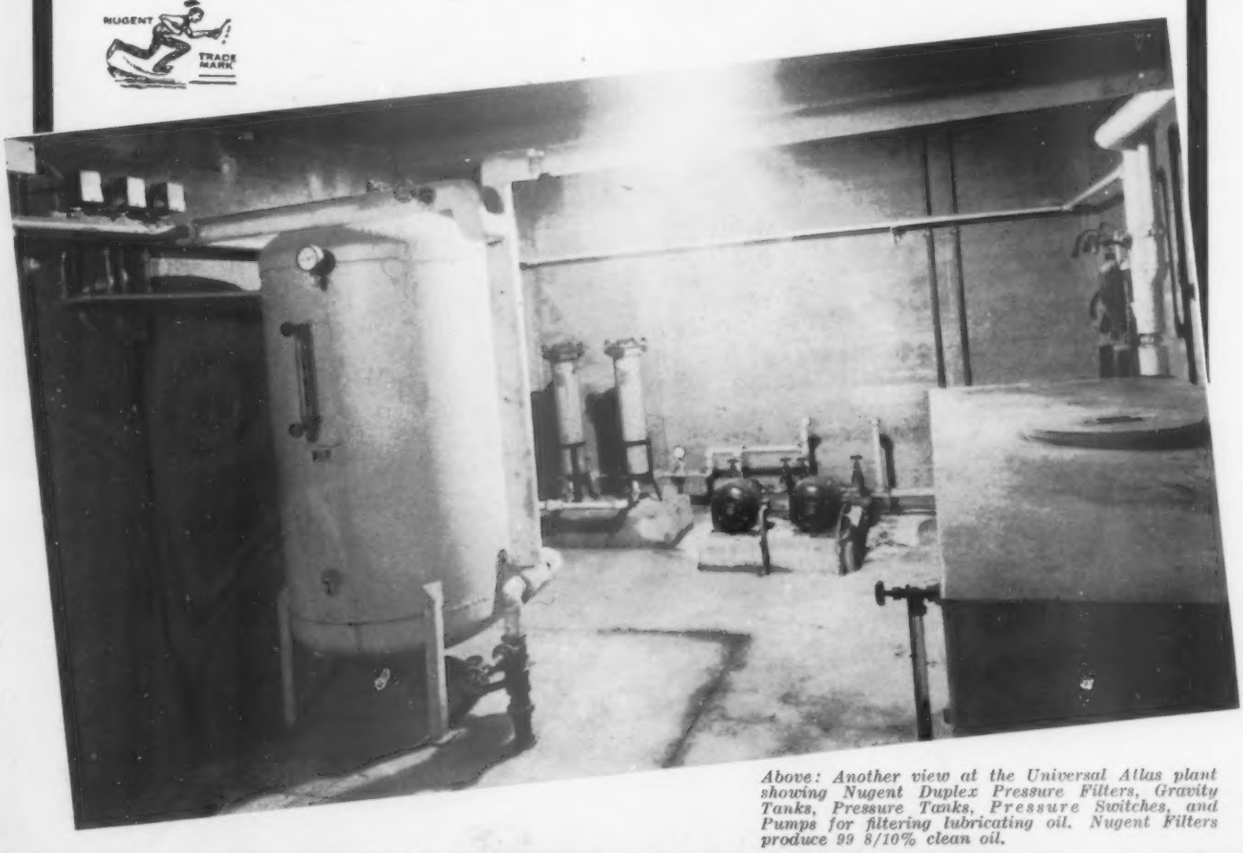
NUGENT OILING and FILTERING SYSTEMS

. . . Chosen for a Vital Service at Universal Atlas Cement Company, Northampton, Pennsylvania

AT THE NEW PLANT of the Universal Atlas Cement Company, Nugent Filters and Oiling Devices are performing a vital service. Nugent oiling systems provide automatic, foolproof lubrication for each of the four rotary kilns in this plant. These kilns measure 250 ft. long and are 10½ ft. in diam., and have an inside calcining temperature of about 2800°F. . . . Both the white and grey cement raw-material and clinker grinding departments also utilize Nugent oiling systems to assure efficient lubrication. . . . Nugent Patented Pressure Filters, widely used in many types of industries are also used at this modern plant for the filtration of lubricating oil.

For more than 45 years Nugent Filters and oiling devices have served industry . . . helping to conserve lubricating oils and fuel oils. Let this experience and knowledge help *you* in your oil conservation problems — Write Nugent today.

Wm. W. Nugent & Co., Inc.
429 N. Hermitage Avenue
Chicago 22, Illinois



Above: Another view at the Universal Atlas plant showing Nugent Duplex Pressure Filters, Gravity Tanks, Pressure Tanks, Pressure Switches, and Pumps for filtering lubricating oil. Nugent Filters produce 99 8/10% clean oil.

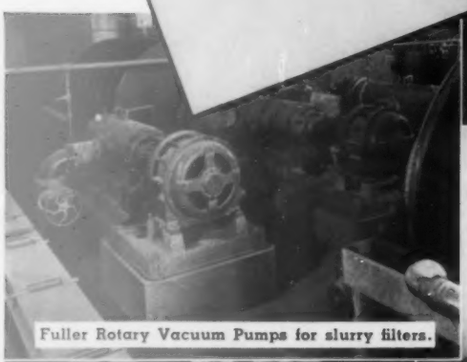
NUGENT FILTERS and LUBRICATION SPECIALTIES since 1897

EQUIPMENT AT

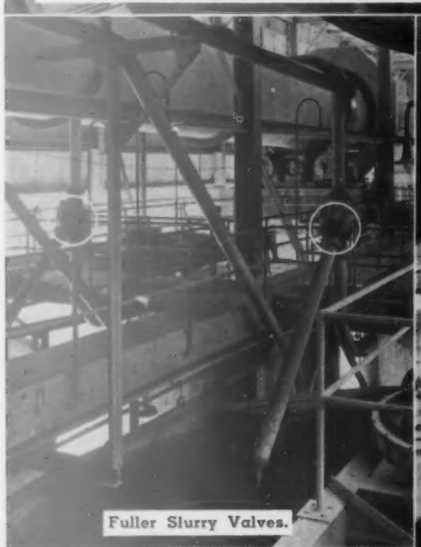
FULLER

The Airveyor conveying anthracite culm to boiler room.

Bulk car loading.



Fuller Rotary Vacuum Pumps for slurry filters.

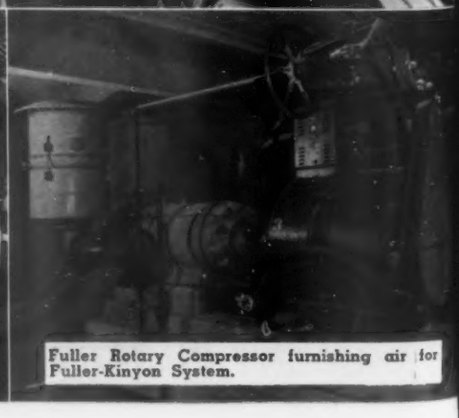


Fuller Slurry Valves.

Partial view, top of storage silos, showing Fuller-Kinyon transport lines and diverting valves.

Rotary Gate Valves in tunnel underneath silos.

Fuller Air-Quenching Inclined-Grate Cooler.



Fuller Rotary Compressor furnishing air for Fuller-Kinyon System.

PRINT IN BL

UNIVERSAL ATLAS

We point with pardonable pride to the fact that much Fuller equipment was selected and installed in the new plant of the Universal Atlas Cement Company at Northampton, Pa., equipment that contributes in a large measure in making it, not only most modern and up-to-date, but which will serve them for many years in the efficient operation of this plant.

FULLER COMPANY, CATASAUQUA, PA.

CHICAGO 3, Marquette Bldg. SAN FRANCISCO 4, Chancery Bldg.
WASHINGTON 5, D. C., Colorado Bldg.

MAJOR EQUIPMENT INSTALLED

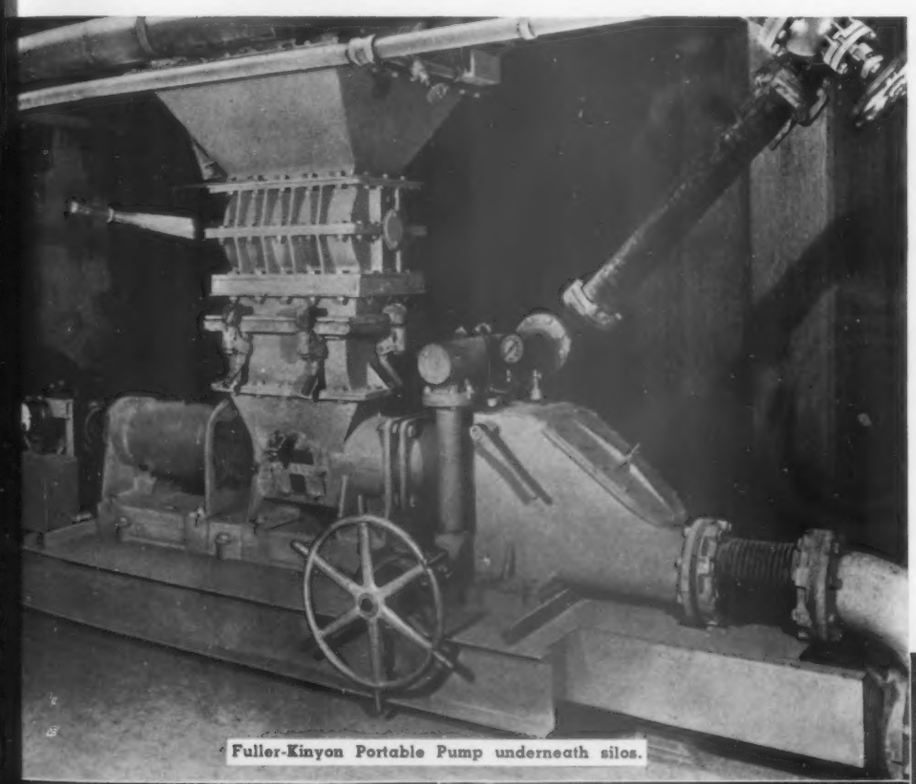
Fuller-Kinyon Systems for conveying cement to storage silos and from storage to packer bins, both gray and white cements. Bulk car loading. Also conveying flue dust.

The Airveyor for conveying anthracite culm from storage to boiler room.

Fuller Air-Quenching Inclined-Grate Cooler.

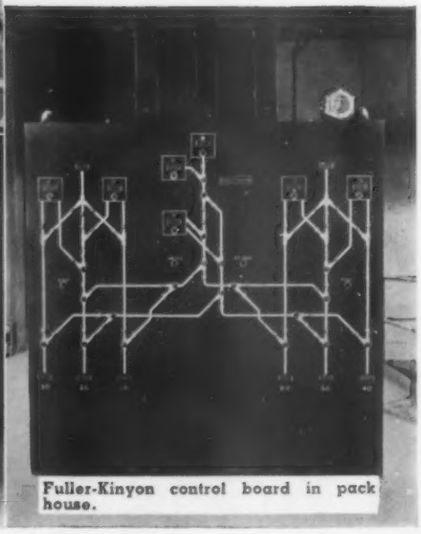
Fuller Rotary Compressors, furnishing air for Fuller-Kinyon Conveying Systems and slurry agitation.

Fuller Rotary Vacuum Pumps for slurry filters.



Fuller-Kinyon Portable Pump underneath silos.

G-36T



Fuller-Kinyon control board in pack house.

Fuller-Kinyon Stationary Pump conveying flue dust, direct connected to rotary compressor.

Fuller-Kinyon Stationary Pump in finish mill, direct connected to duplex rotary compressor.

T IN BINDING

for THIS battle, G.H.Q. is at YOUR own desk!

★ Here's how you—yes, YOU—can carry out a smashing "pincer movement" against the Axis. Swing in on one flank with increased production of war goods! Drive in on the other with redoubled purchases of War Bonds through your Pay-Roll Savings Plan!

You're an officer in both of these drives. Your personal leadership is equally vital to both. But have you followed the progress of your Pay-Roll Savings Plan as closely as you have your production?

Do you know about the new Treasury Department quotas for the current Pay-Roll Allotment Drive? *Quotas running about 50% above the former figures?* You see, these new quotas are based on the fact that the armed forces need more money than ever to win the war, while the average worker has more money than ever before to spend. Particularly so, on a *family income* basis—since in so many families several members are working, now.

Remember, the bond charts of today are the sales curves of tomorrow! Not only will these War Bonds implement our victory—they'll guard against inflation, and they'll furnish billions of dollars of purchasing power to help American business re-establish itself in the markets of peace.

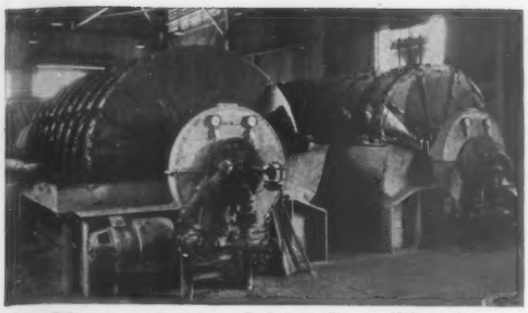
So get this new family income plan working at once. Your local War Finance Committee will give you all the details of the new plan. Act today!

This advertisement prepared under the auspices of the War Advertising Council and the U. S. Treasury Department.

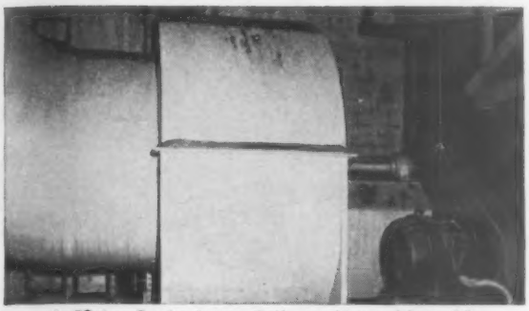
LET'S KEEP ON Backing the Attack!

This Space is a Contribution to America's All-Out War Effort by

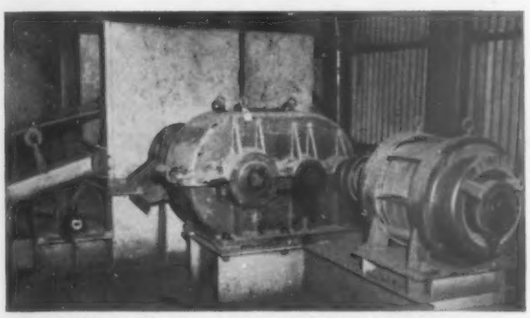
PIT AND QUARRY



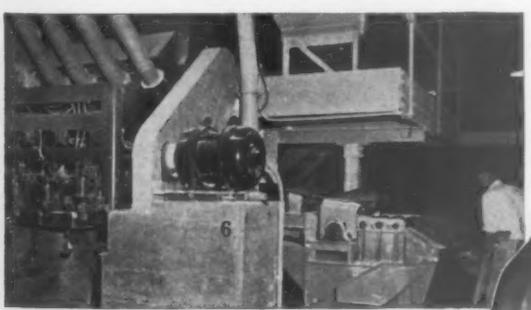
Filter speeds are varied to suit conditions by the 5 hp. D-c. Adjustable-speed Reliance Gearmotor.



A 50 hp. Squirrel-cage Reliance Motor drives this clinker cooler fan.



A 100 hp. Reliance Induction Motor for conveyor to secondary crusher building.



White Cement Packer is powered by a 25 hp. Reliance Induction Motor.

Recirculating Pump in flotation cell house driven by a protected-type A-c. Reliance Motor.

Congratulations
UNIVERSAL ATLAS

The new Northampton plant of the Universal Atlas Cement Company is one of the big industrial news stories of recent months. And to the industry, the equipment installed there is newsworthy, too.

Reliance is proud to have played a part in equipping this newest and most modern cement plant. Reliance Motors are providing reliable power for many interesting operations, a few of which are illustrated here.

Congratulations are due Universal Atlas and its entire planning and operating organization on the noteworthy forward step in cement mill design and construction that is represented in the new Northampton plant.

RELIANCE ELECTRIC & ENGINEERING COMPANY

1088 Ivanhoe Road • Cleveland, Ohio

Birmingham • Boston • Buffalo • Chicago • Cincinnati • Detroit • Greenville (S.C.) Houston • Los Angeles • Minneapolis • New York • Philadelphia • Pittsburgh Portland (Ore.) • St. Louis • San Francisco • Syracuse • other principal cities

Type AA Reliance Squirrel-cage Induction Motor with ball bearings.

RELIANCE A-C D-C MOTORS

CLEANING THE DUST and DIRT from the Air!

Parsons
OVAL BAG DUST ARRESTORS

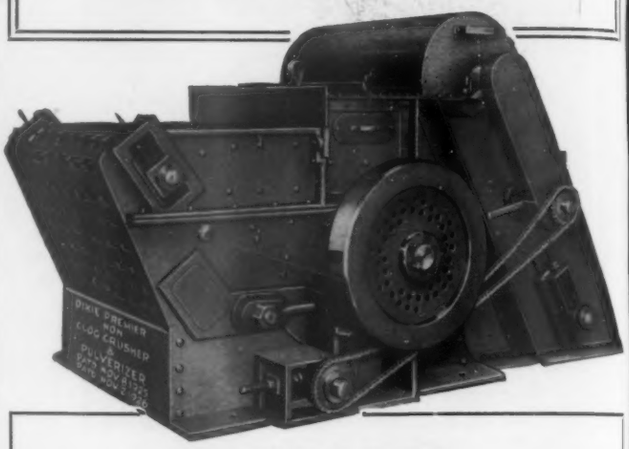
It is a proven fact that clean air in a plant makes an immediate "about face" in production, absenteeism and maintenance costs. In 99 cases out of 100 production and efficiency goes up while maintenance goes down. On a strictly dollar and cents basis Parsons modern Oval Bag dust arrestors pay for themselves in no time because they speed up production, protect and prolong the life of employees, equipment and buildings and pay dividends for years to come. Parsons exclusive features include unique patented Oval Filtering Bags, Non-rusting Arrestor Case, Simple Texrope Drive, Heavy Duty Welded Hoppers.

Modern Dust control by Parsons Ovals means healthier and more profitable business, peak production, less breakdowns, fewer layoffs. Send for our free bulletin.

PARSONS ENGINEERING CORPORATION
2545 EAST 79th STREET • CLEVELAND, OHIO

WHEN PRODUCTION CANNOT LAG

DIXIE GETS THE CALL!



DIXIE
Non-Clog
HAMMERMILLS

NOTE THESE TYPICAL TOUGH JOBS LICKED BY DIXIES

1. Replaced four crushers for high moisture content bauxite . . . cut power in half . . . reduced drying costs . . . increased production.
2. Efficiently crushing clay balls to reclaim phosphate in Florida phosphate plants.
3. Crushing phosphate muck in T.V.A. Tennessee plant.

HERE'S WHY . . .

The Dixie Non-Clog Hammermill is the only crusher with a moving breaker plate. Provides positive mechanical feed. No manual pushing of material needed. Even the most plastic, wet, clayey material will not slow production or clog hammers. This feature alone has saved the cost of 10 men in one company!

And because the Dixie moving breaker plate can be adjusted forward or backward from the hammer points, quality and size of production can be controlled. This feature also provides additional assurance against clogging.

These are but two of Dixie's outstanding features. Send coupon below for free booklet, "More Efficient Crushing of Raw Materials" which gives complete facts.

DIXIE MACHINERY MFG. CO.
4202 Goodfellow Blvd., St. Louis, Mo.

GET THE FACTS!

DIXIE MACHINERY MFG. CO.
4202 Goodfellow Blvd., St. Louis, Mo.

Please send free booklet on Dixie Non-Clog Hammermills. We want to crush.....

Name.....

Company.....

Address.....

City..... State.....

"One of the best Cement Storage Silos ever built"

UNIVERSAL ATLAS new plant at Northampton, Pennsylvania

ASK THE MEN WHO OWN THEM

CEMENT SILOS
by Macdonald
for **UNIVERSAL ATLAS CEMENT COMPANY**

Outstanding reinforced concrete structures in the cement industry are Macdonald-built . . . with important installations throughout the U. S., Mexico, Central and South America.

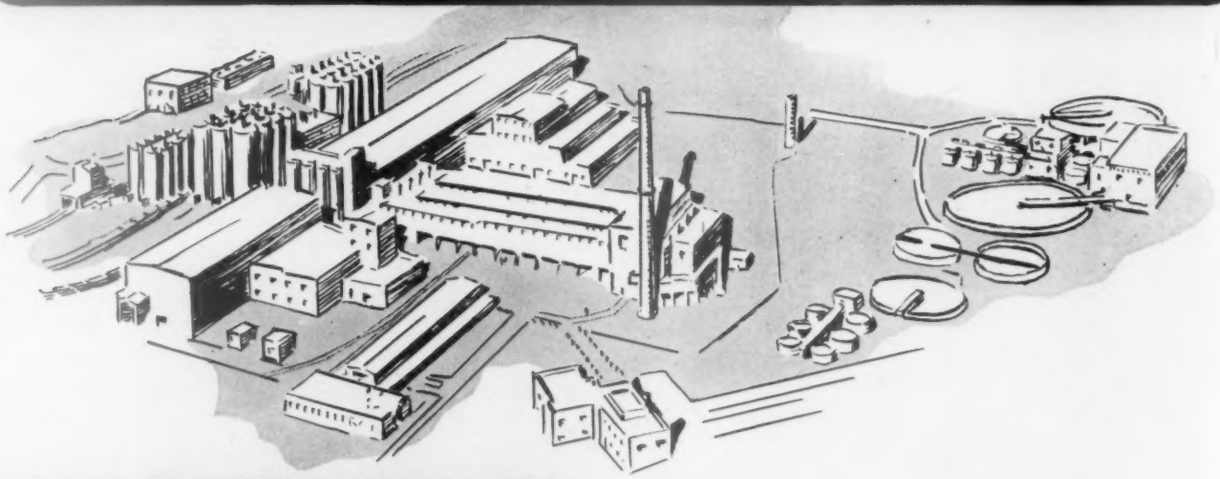
Modern silo storage plants involve improvements as up-to-date as the latest model airplane. The steel cone bottoms of the white and gray cement silos at this plant are self-cleaning and eliminate waste storage space and operating labor.

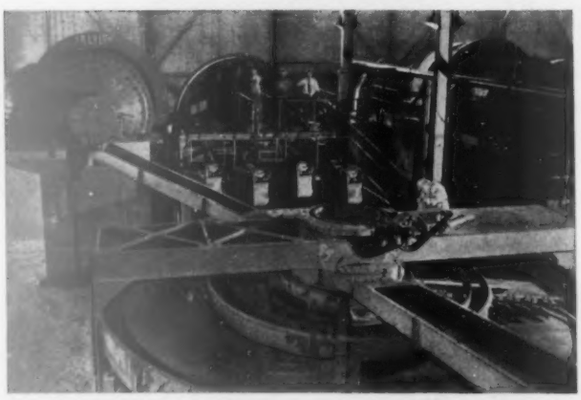
We invite your inquiries on construction problems.

MACDONALD ENGINEERING COMPANY
One North La Salle Street, Chicago, Illinois

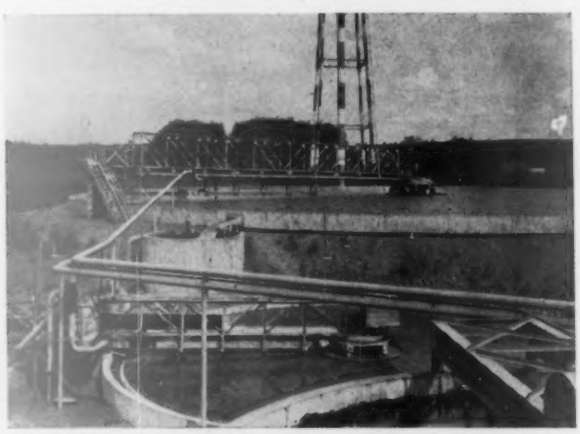
UNIVERSAL ATLAS' NEW NORTHAMPTON PLANT

DORR EQUIPPED FOR MODERN CEMENT PRODUCTION





Close up of Dorr Bowl Classifier in closed circuit with ball mill.



Dorr Slurry Mixers with Dorr Torq Thickener in background.

UNIVERSAL ATLAS' new plant at Northampton, Pa., employs the very latest developments known to the cement industry. Result—production of cements of different chemical composition from a single source of crude limestone readily available at the property through the use of the Breerwood Process.

Dorr Classifiers are employed for primary and secondary grinding—Dorr Thickeners for slurry and concentrates thickening—Turbo Mixers for slurry conditioning and a battery of Dorr Slurry Mixers for blending and storage. Dorr Classifiers and Thickeners are also used for the separate sand-iron circuit—an innovation used for the first time at Northampton.

This flexible plant—capable of delivering a diversity of products from a uniform raw material—is a good example of how the cement industry is meeting the challenge of today's intricate construction requirements. It is a good example, too, of the important role Dorr equipment is playing in these advanced methods.

If you are planning a new plant or would like to convert to more modern methods, we will be glad to help you with our experience.

DORRCO

THE DORR COMPANY, ENGINEERS

NEW YORK, N. Y. . . . 570 LEXINGTON AVE.
ATLANTA, GA. . . . WILLIAM-OLIVER BLDG.
TORONTO ONT. . . . 80 RICHMOND ST. W.
CHICAGO, ILL. . . . . 221 NO. LA SALLE ST.
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LOS ANGELES, CAL. . . . . 811 WEST 7TH ST.

RESEARCH AND TESTING LABORATORIES
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570 LEXINGTON AVE., NEW YORK

DORR

RESEARCH — ENGINEERING — EQUIPMENT

ADDRESS ALL INQUIRIES TO OUR NEAREST OFFICE

National Gypsum (*from page 56*)

should be designed and built to produce item *X* on a small scale, and this was the job given to the manufacturing concern. The procurement of equipment for the pilot plant presented a problem, since priorities were not used, but a survey of surplus equipment at our factories and in the stocks of used-equipment dealers, plus some ingenious engineering enabled us to build a satisfactory pilot plant.

A competent research engineer was assigned the job of conducting the experiments on the pilot plant. Incidentally, the pilot plant was constructed by the equipment manufacturer and the experiments were carried out in his plant so that the manufacturer's facilities could be used in the event changes were necessitated in the pilot plant.

When a product which met the sales specifications was produced in the pilot plant and the cost analysis was favorable, the entire problem was put into the hands of a firm of designing engineers. These engineers designed the entire master plant and worked up complete construction estimates. After the design had been checked by our own Engineering Department, the entire project was placed before the board of directors for their approval and the appropriation of the necessary money.

At this point we considered that the project had gone as far as was practical, due to war-time restrictions, so that the entire project was filed away. As soon as labor, materials and equipment are available after the war, the contract for constructing the plant will be let, equipment will be purchased and production started at the earliest possible date.

Our other production problems of post-war planning have followed similar lines, although most of them are much less elaborate than the production of item *X*. We feel, however, that the important point in this entire program is the fact that very few of the company's personnel are involved in the work, other than for consultation, thus leaving the operating and sales force free to concentrate on the war effort. The Director of Post-War Planning of the National Gypsum Company reports periodically to a Post-War Planning Committee composed of the president, two vice-presidents, the treasurer and the director of research. The written reports bring the committee up to date on the progress of all problems and special reports are then written for the board of directors where sizable appropriations are required. The Post-War Planning Committee must approve each report before work is started on the next stage of any particular problem or before new projects are taken to the director.

Although the original list of problems and products for post-war planning was sizable, we have found it wise to concentrate on one problem, or one set of related problems, at one time, and carry it through to completion before tackling the next problem. Sales and statistical analyses are carried on well ahead of the production problems but, due to the limited personnel of our Post-War Planning Department and the fact that we must not interfere with the present operating and sales personnel, we find that a better job can be done by carrying each problem to the final blueprint stage before getting into the details of the next problem.

Although we could not give a detailed account of the post-war plans of the National Gypsum Company, the fact that concrete plans are being made and that these plans are being carried to the blueprint stage is of the utmost importance. If all industries throughout the United States, both large and small, will make their post-war plans *now* and carry them out to the blueprint stage, ready for immediate action as soon as labor and materials are available, then we believe that there need be no fear of a chaotic condition of unemployment after the war, nor any fear of the necessity of huge expenditures by the federal government on unproductive projects to create jobs and take up the slack in employment.

War Affects Gypsum Industry Adversely

The change from peace-time to war-time construction in 1942 and the markedly different types of materials required in war housing affected the gypsum industry adversely and general activity declined sharply, according to reports supplied by producers to the Bureau of Mines.

The overall decrease in operations from 1941 is indicated by the 24-per cent. slump in production of calcined gypsum. Output of crude gypsum from domestic mines in 1942 declined only 2 per cent. from 1941 owing, no doubt, to the necessity of supplanting imported supplies along the East Coast and a strong demand for gypsum products in Far Western, Southwestern, and some Midwestern States. Although data are not available for publication, it is probable that imports of crude to Atlantic tidewater plants from Canada were curtailed severely by war restrictions.

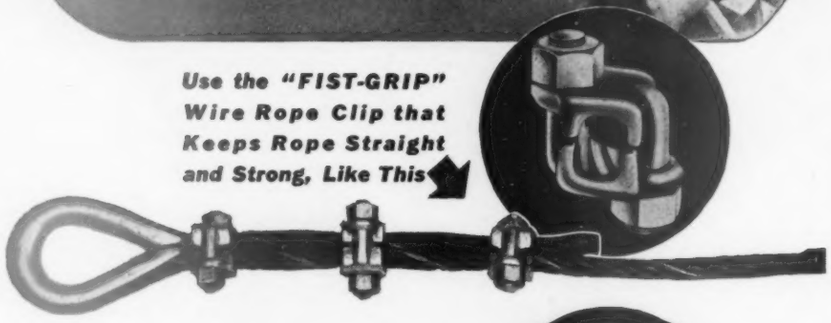
Sales volumes of most gypsum products declined markedly from 1941 but these declines were compensated in part by the strong demand for cement retarder, agricultural gypsum, wallboard and sheathing, of which sales advanced to record volumes in 1942. In addition, markets for laminated board products expanded rapidly following their introduction about the middle of the year. Principally as a result of the brisk demand for certain of the highly processed, prefabricated products which command a higher price than other gypsum materials, the value of total sales by the industry declined only 9 per cent. from the record set in 1941. Although labor and material costs increased, prices of most gypsum products in 1942 were relatively unchanged from the levels that have prevailed in recent years. Prices were frozen May 11 by the General Maximum Price Regulation of the Office of Price Administration at the highest selling value, f.o.b. mill, obtained during March 1942. Maximum Price Regulation 188 effective August 1 removed gypsum products from the general order and continued the March prices as maximum.

Bentonite Shipments Indicate Good Demand

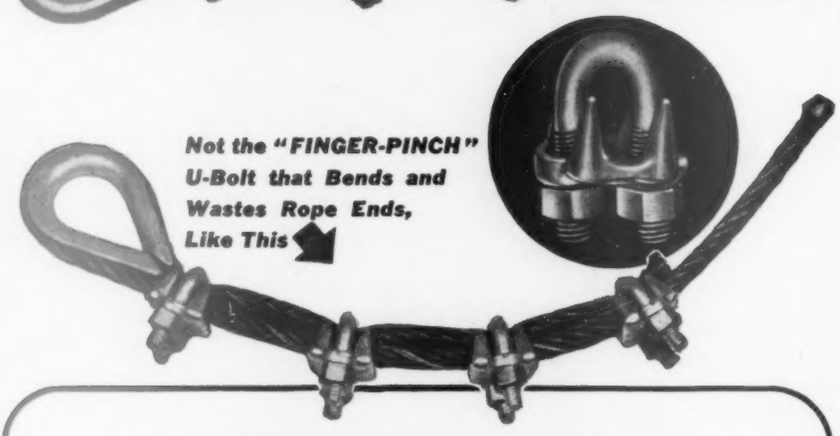
Bentonite, a versatile clay widely used in foundries, oil refining, and oil well drilling, enjoyed a good market in 1942. Shipments, which increased 6 per cent. over 1941, from 354,028 to 374,967 tons, reached a new record, according to the Bureau of Mines. Wyoming produced slightly less than in 1941 but was still the leading producer, with 37 per cent, of the total. South Dakota increased shipments by 54 per cent. and supplied 24 per cent. of the total.

Reflecting the high quality of the bentonite from the Wyoming-South Dakota district its 61 per cent. of the national tonnage commanded 76 per cent. of the value. For the entire United States the average value in 1942 was $6.80 per ton which compares with $6.93 in 1941 and $7.65 in 1940.

Here's Another Way to Make Wire Rope Last Longer



Use the "FIST-GRIP" Wire Rope Clip that Keeps Rope Straight and Strong, Like This



Not the "FINGER-PINCH" U-Bolt that Bends and Wastes Rope Ends, Like This

NOTE: The photographs of wire rope assemblies shown here are exact representations of two ¾-inch ropes fitted with recommended number of clips; all nuts on both wires uniformly tightened with indicating wrench. When "Fist-Grip" Clips are used, rope remains straight, whether or not load is applied.

Congratulations to you wire rope users cooperating with wire rope companies in Victory Rope-Saving Drive!

Laughlin "Fist-Grip" Safety Clips fit right in with your program. Don't risk wasting rope with bending, warping U-bolts.

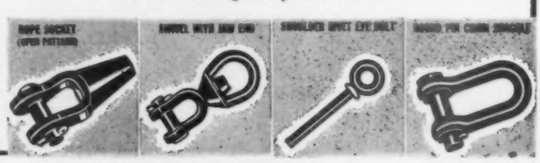
Save war-essential metals, too. Safety Clip design, with uniform vise-like grip, delivers full rope strength with less clips. Impartial laboratory tests prove 3 do the work of 4 U-bolts.

Finally, you save both time and man-power with Laughlin "Fist-Grip" Safety Clips. Identical halves—they can't be put on backwards, even by green men—fewer accidents! Nuts on opposite sides are faster to put on and take off. Design is stronger—and those drop-forged bolts are also plenty strong. Bolt ends don't protrude, don't become battered and useless.

Save rope—clips—time—money—man-power—starting now!

THE THOMAS LAUGHLIN Company
PORTLAND, MAINE

Laughlin "Fist-Grip" Safety Clips distributed through Mill Supply Houses. Look for Laughlin Products in Pit and Quarry Handbook.



PERSONAL MENTION

RICHARD B. STILES, a former salesman and more recently manpower procurement officer for the Warner Company, Philadelphia, has been appointed safety engineer.

R. H. MCCORMICK has been made advertising manager of the American Hoist & Derrick Company, St. Paul. He formerly headed the advertising department of Vascoloy-Ramet Corporation, North Chicago, Illinois.

WILLIAM L. JURDEN, formerly production manager of four National Gypsum Company plants, has been appointed director of post-war planning for the company. He joined National Gypsum in 1938, assisting GORDON H. TARBELL, vice president in charge of production. Three plants supervised by Mr. Jurden at Bellefonte and York, Pa. and Orando, Va., will be taken over by FRED MANSKE. The fourth has been taken over by Mr. Tarbell.

Francis McAdam

FRANCIS MCADAM has rejoined the technical sales staff of the Dewey & Almy Chemical Company. He comes to the company direct, from the War Production Board, Building Materials Division, where he has been Chief of the Non-Metallic Section, which controlled the manufacture and distribution of Portland cement, ready-mixed concrete, concrete products, gypsum, rock wool, hard board, insulating board, asphalt roofing, and asphalt siding. Having completed his task of increasing production of concrete materials to meet the emergency needs of the war-construction program and assuring efficient distribution to the most critical end-uses, Mr. McAdam felt that with the job done he could properly decide to rejoin Dewey & Almy, to work on new developments of the company's Portland Cement Division.

CURTIS LOGSDON of Beardstown, Illinois, has purchased the Lawson Sand Company plant at Hannibal, Missouri, and plans to expand the operations as soon as equipment can be obtained.

Joseph Weis, formerly manager of the Railroad Concrete Products Company, Denison, Texas, is establishing his own concrete-products plant to be known as the Denison Concrete Company.

In addition to the production of pre-cast concrete articles at the plant, including well curbing, small pipe and other units, Mr. Weis will have a portable unit for sidewalk, cellar and other concrete work. The plant will employ nine men.

CHARLES B. McCOY has been named director of sales of the Explosive Division of E. I. du Pont de Nemours & Company. He had been serving as director of chemical and miscellaneous sales. In his new position, all sales of the Explosives Division will be in his charge.

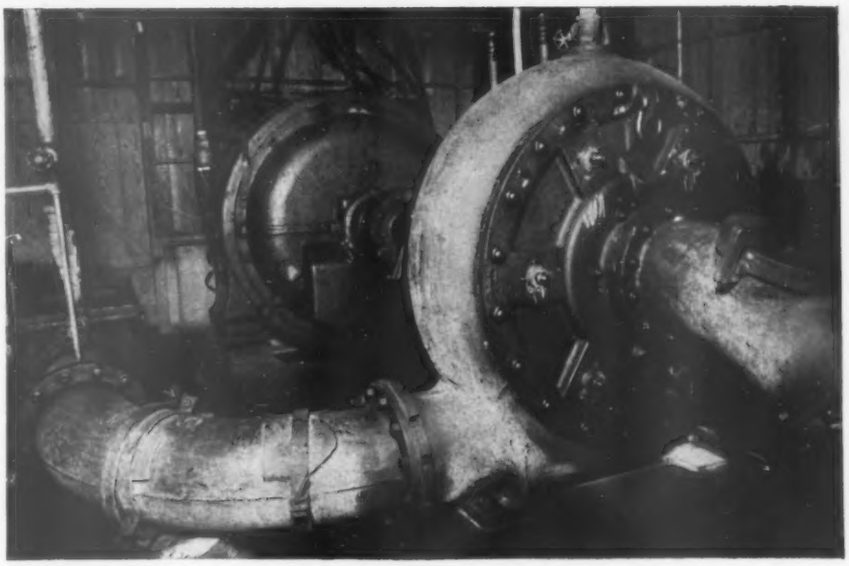
GEORGE A. MORRISON, mining engineer, has completed his contract with the Columbia Chemical Division of the Pittsburgh Plate Glass Company at its Barberton, Ohio plant. Two shafts, 2,258 and 2,323 feet deep were sunk and a modern mine developed for the mechanical loading of limestone. Mr. Morrison can be reached at 148 Atlas Street, Akron.

O. R. OSBURN, district foreman for the Missouri State Highway Department for 5½ years resigned that position October 1 to take over the management of the St. Joseph Vault Company at St. Joseph, Missouri. The company is a newly-established one and makes concrete burial vaults. Mr. Osburn's territory embraces 17 counties in Missouri and three in Kansas.

OBITUARY

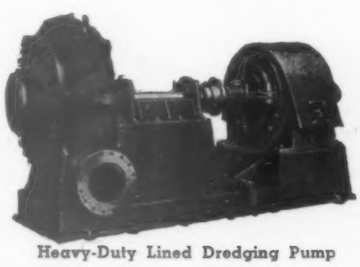
HARRY C. LANE, 44, was fatally injured September 20 at the France Stone Company plant at Logansport, Indiana. He was caught in a belt conveyor while attempting to dislodge some stone that had become caught. He died of head and chest injuries as he was being rushed to a hospital.

GEORGE VANG, 64, prominent Pittsburgh industrialist, passed away in September. He was president of the Iron City Sand & Gravel Corporation, the Ohio River Sand & Gravel Corporation, the Vang Crushed Stone Company, and the Vang Ready Mixed Concrete Company.

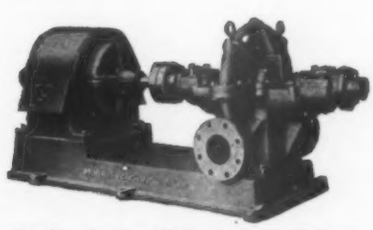


CONVINCING THE SKEPTICS . . .

The favorite job of the Morris Engineers is to prove how often the "*impossible*" is possible in pumping operations. Many are the instances in which Morris Pumps are developing "*impossible*" efficiencies, handling "*impossible*" mixtures, operating under "*impossible*" conditions, and lasting "*impossibly*" long. If you have a difficult problem involving the handling of liquids or materials in suspension, don't give it up, give it to the Morris engineers. They'll give you the answer.



Heavy-Duty Lined Dredging Pump



Double Suction Horizontally Split Pump for Clear Liquids

MORRIS MACHINE WORKS
Baldwinsville, N. Y.

MORRIS
ESTABLISHED 1864

Export Office
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CENTRIFUGAL PUMPS

STUART J. SAKS, president of the Morris Machine Works, Baldwinsville, New York, died September 5, at the age of 52. He joined the company about three years ago and became its president in 1941. Mrs. Windsor Morris has been elected president of the company with its management continuing in charge of A. G. Forssell, vice-president.

FRANK P. HOOVER has been appointed assistant sales manager at Humboldt, Kansas, and M. H. MILLER district sales manager at Wichita by the Monarch Cement Company.

CLAUDE E. NEGLEY, 70, former owner of the Negley Sand & Gravel Excavating Company of Indianapolis, died at his home in that city on October 5. He was a native of Castleton, Indiana, but had spent nearly his entire life in Indianapolis.

Karl W. Lick, 62, superintendent of the General Material Company, ready-mixed - concrete producer of St. Louis, met his death on September 21 when a rim flew off a truck tire he was inflating, striking him in the head.

The accident occurred in the company's garage.

FELIX W. ZILISCH, 53, secretary and treasurer of the Best Block Company of Milwaukee, collapsed and died of a heart attack at his home in that city on September 10. He apparently had been in the best of health before the attack. He established a cement-block firm in 1921, selling out later and affiliating with the Best Block Company. Surviving are his mother, three brothers and four sisters.

JOSEPH G. KUHN, executive vice president of the Arundel Corp., and a leading hydraulic and dredging engineer, died at Baltimore, Md., Aug. 31. In 1917 Mr. Kuhn supervised the building of what was then the country's largest drydock at the Philadelphia Navy Yard. He was also associated with the dredging of the New York Barge Canal in 1913 and the construction of a breakwater at Cape Lookout, near Wilmington, N. C.

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BELT CONVEYOR IDLERS

Alert operators are reducing their bulk material handling costs by installing Continental Belt Conveyors. Continental Idlers have what it takes—they are designed and built to do a real job. They will do your job better and cost no more than ordinary idlers. Crushed stone, cement, slag, sand, gravel and similar products are being handled daily for a few cents a ton via Continental Conveyors.

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Write today for a copy of Bulletin ID-103 so you can better judge for yourself the superior features of this Precision Built, Streamlined, Efficient CONTINENTAL CONVEYOR IDLER.

INDUSTRIAL DIVISION

CONTINENTAL GIN COMPANY

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Legal Decisions

By LEO T. PARKER

Law of Deceit

Considerable discussion has arisen from time to time as to exactly what constitutes fraud or "legal deceit". The term "legal deceit" and "fraud" are applicable to all contracts of sale, employment contracts, and in fact to all classifications of contracts. Therefore, it is important to know that acts, promises and agreements which may constitute fraud extend to every possible case in which a fiduciary relationship exists. It may be moral, social or business. The rule embraces those informal relations which exists when one man, as an employer, trusts and relies upon another. In fact the relations between employer and employee are familiar instances in which the principle of fiduciary relationship is applied, in the strictest sense, by modern courts.

For illustration, in *Illinois Minerals Company v. McCarty,* 48 N.E. (2d) 424, it was shown that the International Silica Company was engaged in the business of producing, mining, milling and selling silica. It sold its business to the Illinois Mineral Company which employed Joe Webb as a mine foreman. Webb, the Illinois Mineral Company, copied and made a list of the names of customers and of sales, amounts and grades of silica purchased by

such customers. Later Webb sold this information to a competitor of his employer, the Illinois Mineral Company.

Suit was filed against the competitor and it was alleged that the company incurred great expense in accumulating names and addresses of customers and by the diligence of its agents and officers has established a profitable clientele throughout the United States and Canada. One of the principal assets of the company was the record of this clientele and customers. This record contained not only the names and addresses, but also the grade, price, and quantities of silica purchased by each. Its employees, including Joe Webb, who had access to these records all were instructed to keep the information confidential so that it could not get into the hands of competitors.

It is interesting to observe that this court held that the competitor, and his heirs also may be liable in full damages the company from whose files Webb obtained the confidential data.

Dust-Control Methods

Modern higher courts have held that when an employee sues his employer to recover damages for illness caused by breathing dust the employer is not necessarily absolved from liability by showing that he used the same method and appliances customarily used by other employers in the same business.

Evidence of better methods used by other employers is admissible even though the employer proves that he used the methods *customarily* adopted by others in same business. However, as a general rule, modern courts hold that an employer may avoid liability for the sickness of an employee if he proves that he violated no valid law and, also, that he used the *same* degree of care used by other employers under similar working conditions.

For illustration, in *Powell v. Durant Company,* 136 Pac. (2d) 904, it was disclosed that an employee died and his dependents sued the employer to recover damages. It was alleged that the employer failed to maintain a safe place in which to work. The evidence showed that the atmosphere in the place where the employee worked was constantly filled with dust and that for this reason it was believed that the employer could be held liable irrespective of other testimony. In fact, the employee believed that no other testimony was necessary in order to hold the employer liable even before his death. Subsequently, the employee's dependents also proved, among other facts, that although the dust was "thick" the employer did not instruct the workmen to use dust masks. Moreover, the employer did not warn the workmen of dangers incident to the dust.

The employer proved that he used the same degree of care to protect his employes against breathing dust, and contracting diseases, as was being exercised by other employers under similar circumstances. The higher court refused to hold the employer liable for the death of the employee, and said:

"Plaintiff failed to show that the defendant (employer) operated its mill in any manner below the standard fixed by custom, and failed to show that such custom was no longer recognized as the best method of operation. It was necessary to show one or the other of these circumstances in order to make out a case of primary negligence for the jury."

Therefore, it is quite apparent that the exercise of ordinary care, under all existing circumstances, is the test by which it should be determined whether an employer has been negligent. It is generally conceded by

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the various modern courts that good operators exercise reasonable and ordinary care and caution as to types of machinery used and as to the general methods of operations. And, therefore, proof of custom and practice among good operators in the area, and that the employer being sued conformed to such general practice, is competent evidence of the exercise of ordinary care on the part of the employer. Such evidence would also be competent for the purpose of showing that a safe place in which to work was furnished by the company.

Proof Necessary

While it is true that the failure of an employer to provide safety devices and conditions required by law does not prove that the employee's injury resulted from the *neglience* of the employer, yet testimony of this character tends to prove that the employer did not use ordinary care to safeguard his employees against contraction of the disease.

In the case of *Schell v. Du Bois, Adm'r,* 94 Ohio St. 93, the higher court held that the violation of a state statute enacted for the protection of employees is negligence *per se*. Moreover, where an act of negligence by an employer is a direct and proximate cause of an injury, not directly contributed to by the injured person, the employer is liable.

In the opinion in this case, the court quoted with approval, as follows:

"The plaintiff (employe) . . . predicated his right of recovery upon the violation of the statute, which made it an absolute duty on the part of the employer to adopt certain measures to protect its employees. It was not for the jury to say whether a failure to comply was negligence."

The holding in this case has been followed in many subsequent cases and is now the settled law in many states.

In the case of *Swoboda v. Brown*, 196 N.E. 274, it is held that the distinction between negligence and negligence *per se* is the means of ascertainment. The former must be found by the jury from the facts, the conditions and circumstances disclosed by the evidence; the latter is a violation of a specific requirement of law or ordinance, the only fact for determination by the jury being the commission or omission of the specific act inhibited or required.

It therefore appears that the violation of a statute, prescribing a general rule of condition of businesses for the protection of employees, is not technically negligence *per se*. However, a violation of such a general rule may constitute ordinary or legal negligence.

Salesman's Guarantee

An employer never is bound by a guarantee made by a salesman unless (1) The employer has notified the purchaser, that he will be bound by contracts, statements and guarantees made by the salesman; or (2) in the past the salesman's employer has, without due notification, accepted contracts made by the salesman whereby the court may imply that he is authorized to make valid contracts; or (3) the salesman practiced actual fraud, under which circumstances the employer is responsible although he did not expressly or impliedly authorize the salesman to perform the fraudulent acts, or make the fraudulent statement or guarantee.

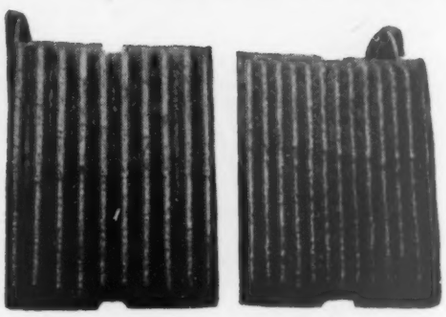
For example, in *Kearns v. Biltwell Company,* 23 S.E. (2d) 310, it was disclosed that a salesman guaranteed his employer's products to a purchaser. Later the purchaser sued the seller for breach of this warranty. In holding the salesman's employer not liable, the higher court said:

"The allegation is that the 'defendant's salesman and employe guaranteed', and 'relying upon said guarantee, the plaintiffs purchased the bed'. This is far from alleging that the defendant (employer) made the warranty."

This court clearly indicated that a

Crushes 4900 tons!

WHERE FORMERLY 1800 TONS HAD BEEN THE LIMIT!



WHEN *your* crusher jaws become seriously worn, don't think of throwing them on the scrap pile. Instead, save yourself the trouble of a costly replacement and an annoying shut-down by doing what one company does,—and that is to hard-face worn crusher jaws with wear-resistant Coast Metals. Here 4,900 tons of material are now being crushed, whereas formerly, with uncoated standard manganese jaws, 1,800 tons had been the limit.

Coast Metals Hard-Facing is of particular value wherever it is difficult or impossible to get new parts, or replace those which are worn out because of the heavier load and longer periods of service to which equipment today may be subjected.

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purchaser can not expect to win a favorable verdict in a suit filed against a seller based upon breach of a salesman's guarantee, unless such purchaser proves that the salesman was authorized to make the guarantee, or that such salesman practiced fraud.

Chattel Mortgage

According to modern higher courts, when a chattel mortgage becomes past due, the holder of the mortgage has three remedies for realizing upon his security; (1) He may peaceably take possession of the chattel, advertise and sell it, and apply the proceeds of sale to his secured debt, paying the surplus, if any, to the mortgagor; (2) if possession be refused, he may institute claim and delivery proceedings to get possession of the chattel for the purpose of sale; (3) he may institute a proceeding similar to the foreclosure of a mortgage on real estate.

Except for certain minor differences, a conditional-sale contract is in legal effect tantamount to a chattel mortgage, and a majority of suits on conditional contracts for simplicity may be considered as if upon chattel mortgages. See *Hill v. Winnsboro Granite Corporation,* 99 S.E. 836.

When a purchaser enters into a contract, involving either a conditional contract or a chattel mortgage, usually the purchaser agrees to make stipulated payments on the installment basis. When a purchaser fails to make the agreed payments, and his demands for possession of the encumbered property is refused by the purchaser, the seller has the above-mentioned choice of invoking his remedy against the seller. This means that when a conditional contract of sale or a chattel mortgage becomes past due, the mortgagee may peaceably take possession of the merchandise and advertise, sell and apply the proceeds of the sale to secure the debt. All these points of law were upheld in *Speizman v. Guill,* 25 S.E. (2d) 731, reported June, 1943.

If, for example, a seller repossesses merchandise and offers it for legitimate sale and the money so received is not sufficient to settle the debt owed by the purchaser, the seller may file another suit and recover the deficiency from the purchaser.

In one case a purchaser contracted to purchase a rock crusher for $6,500. He paid $1,200 down and agreed to pay $100 per month until the remainder including interest, was fully paid. After paying a total of $1,400 the purchaser breached the contract and failed to make other payments. The seller repossessed the crusher and offered it for sale. Finally, it was sold for $3,000. Thus, the seller received exactly $1,100, plus overdue interest charges, less than the purchaser had agreed to pay for the crusher. The purchaser believed that when the seller repossessed the crusher his obligations were at an end. However, the seller sued the purchaser for $1,100, plus the interest charges.

The higher court promptly held in favor of the seller, and the purchaser's chattels were attached and sold by legal proceedings to enforce payment of the amount. Obviously, this same law is applicable to real-estate foreclosures, although this phase of law is not known to the average layman.

Who Is an Employer?

Considerable discussion has arisen from time to time over the correct and dependable legal definition of "employer". Also, considerable discussion has arisen from time to time over the legal question: When and under what circumstances may a seller of non-metallic materials sue

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- SAND TANKS and DEWATERERS
- SCREW WASHERS and CLASSIFIERS
- SWINTEK SCREEN NOZZLE LADDERS

EAGLE IRON WORKS
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a member of the military forces of the United States?

Broadly speaking the answer is: Only when the income from the subject of debt is sufficient to satisfy payment.

For example, in *State v. Bunge,* 133 Pac. (2d) 515, it was shown that a soldier while driving his father's automobile seriously injured a pedestrian. The latter sued both the soldier and the father on the ground that when effecting the injury the soldier was the legal agent of the father.

The higher court explained that it was within the discretion of the lower court to determine whether the suit against the father should be postponed until the son could testify in his favor. At the same time the court refused to settle the suit involving the son who filed an affidavit in which he deposed that, after the commencement of the suit, he had been inducted into the military service of the United States.

Tax Not Applicable

Modern higher courts have adopted the view that state legislatures may pass valid laws which at first glance appear to vary established customs. For example, a state legislature may describe as a "contract", within the meaning of a particular statute, a transaction which lacks one or more of the characteristics of a common contract.

For example, in *Yosemite Portland Cement Corporation v. State,* 138 Pac. (2d) 39, the corporation brought suit for the purpose of compelling the state board to approve its claim for a refund of retail sales taxes paid by it under protest. The taxes involved were assessed against the Yosemite company based upon its gross receipts from the sales of cement to a department of the city and county of San Francisco.

During the trial it was proved that the state legislature adopted the sales-tax act, which exempted gross receipts on sales of property "used for the performance of a contract on public works." Therefore, in view of this provision the higher court held that the state must refund all sales taxes paid by the cement corporation. This court said:

"It is a reasonable inference that they [corporation] meant to include the type of arrangement designated as a 'contract' by the legislature."

And, also, it must be noted that the court said:

"The sales tax is imposed on retailers and the exemption is in favor of retailers selling to a governmental agency. . . Certainly it was never the purpose of the statute to protect retailers in their dealings with private contractors but to leave them defenseless when dealing with a governmental agency."

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When you choose a PLAT-O Vibrating Screen to handle your grading operations, you are selecting a screen that will assure efficient, reliable performance 12 months . . . 52 weeks out of the year.
The PLAT-O Screen is lubricated by oil. There's no grease to gum up the works in cold weather. Even in zero temperatures, PLAT-O starts easily by merely pushing the button. Valuable production time is not lost in applying the blow torch.
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Questions and Answers

[Mr. Parker will be glad to answer questions regarding legal problems of PIT AND QUARRY readers. Questions should be addressed to Leo T. Parker, Legal Editor, PIT AND QUARRY.—ED.]

Legal Editor: One subject that I believe is of great importance to all readers of PIT AND QUARRY is the likelihood of sellers of non metallic and similar products, violating the anti-trust laws, when making contracts giving exclusive agencies in different territories. Please explain the law on this subject in detail.—J. W. T.

Answer: It is true that a manufacturer may violate the Clayton Act by granting exclusive agencies. However, generally this method of marketing a product is not deemed a violation of the anti-trust laws. In other words, it has been repeatedly held by the higher courts that the purpose of the Sherman and Clayton Acts is to maintain *free competition in interstate commerce.* Therefore,

in the absence of a purpose to monopolize the market, all manufacturers may exercise great freedom in making contracts granting exclusive agencies.

Where it is proved that the real intention of a manufacturer in granting an exclusive agency is to prevent free competition he is violating the anti-trust laws, but where such contracts are made in the regular course of the business primarily to establish the business along normal lines, the mere fact that a manufacturer refuses to sell to all but his established agents in certain territories is not a violation of the anti-trust laws.

However, see *Margrane-Houston Company,* 258 U. S. 346. In this case it was shown that a large manufacturer made a contract by which he agreed to sell his product exclusively to a certain dealer in a specified territory. The latter also agreed not to sell the products made by other manufacturers. In view of the fact that this manufacturer was sufficiently powerful practically to control the business in this line, the Supreme Court of the United States held the contract to be violative of the anti-trust laws. Another reason why this contract was held to violate the laws is because both the manufacturer and the dealer agreed not to transact business with other firms.

Also, in the leading case (234 F. 964), the court held a contract invalid and in restraint of trade because by it a manufacturer offered his dealers a rebate at the end of the year provided they *would buy no goods from competitors.*

But where a manufacturer gives the exclusive right to certain dealers to sell his products in specified territories, without attempting to monopolize the field, such contracts are generally valid.

* * *

Legal Editor: Recently we sold some machinery and equipment and did not comply with our guarantee to the purchaser. However, at the same time the purchaser did not fulfill his obligations as to making agreed payments. Who is responsible to the other? Please cite a recent case, if it is possible to do so.—J. P. McM.

Answer: It is well-established law that a purchaser may automatically forfeit all his rights to sue and recover damages from a seller by his failure to comply faithfully and fully with his assumed obligations up to the time he files his suit to rescind his contract.

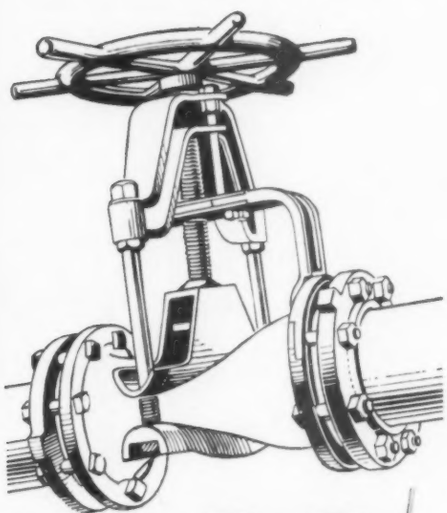
For example, in *Advance C. Scawo,* 268 Pac. 738, it was shown that a purchaser accepted and used equipment, but refused to pay for it on the contention that the seller had induced him to enter into the contract of sale by inserting in the written contract a warranty that the seller knew could not be fulfilled.

The seller filed suit to collect the account and subsequently proved that the buyer himself had failed to comply with the written terms of the contract. In view of this testimony the lower court held the buyer not entitled to rescind the contract. The purchaser then appealed to the higher court and attempted to introduce testimony proving that the seller's salesman had made false oral statements for the purpose of inducing him to sign the contract. However, in view of the fact that the buyer had failed to fulfill his obligations, under the contract, the court held the seller entitled to recover the full purchase price.

Also, in this case the higher court held that when a seller gives a *written* guarantee, the purchaser can not refuse to pay for the merchandise on the ground that he relied upon a *verbal* statement or guarantee of the

MASSCO-GRIGSBY

Pinch VALVES



NO METAL CONTACTS PULP OR LIQUID

Useful for solutions which are highly corrosive or which crystallize at normal temperatures and must be handled at up to 300 F; or for mixtures of solutions or solids which are both corrosive and abrasive.

Recommended for transfer lines, controlling flow in plant, delivering product to storage or cars or for handling fine dry materials. Valve shuts tight on solid particles.

These valves resist wear **more** than metallic parts of gate or plug valves. No packing glands. Freezing temperatures will not destroy sleeve. Easy to operate.

1", 2" and 3" for continuous pressures to 100 lbs.; 4", 6", 8", 10" and 12", up to 150 lbs. Send for illustrated folder.

MASSCO Jr. Rock Bit Grinder

Other Products — MARCY Ball, Rod and Tube Mills; Genuine WILFLEY Concentrating Tables; MASSCO-McCARTHY Hot Millers; Rock Bit Grinders; Belt Feeders; Density Controllers.

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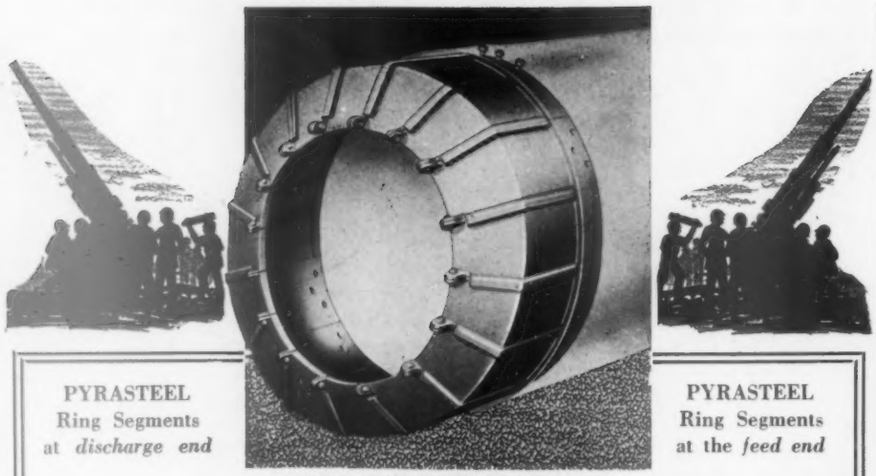
The Mine & Smelter Supply Co.

CANADIAN VICKERS, LTD.
MONTREAL
W. R. JUDSON
SANTIAGO, LIMA



PYRASTEEL
Ring Segments
at *discharge end*

PYRASTEEL
Ring Segments
at the *feed end*

FEED END INSTALLATION

PYRASTEEL Protection at *both* ends

You can't afford to risk kiln-end "burnouts" that cause serious shut-downs and costly repairs. Remember that PYRASTEEL Kiln-Ends are available for both the *discharge and the feed ends* of your rotary kiln. They give continuous service at high temperatures, and outlast ordinary castings many times over . . . as proved in scores of installations where PYRASTEEL is giving satisfactory results. *Write for Bulletin of this "Sure-Fire" heat-resisting alloy.*

CHICAGO STEEL FOUNDRY COMPANY
KEDZIE AVE & 37TH ST.
CHICAGO
Makers of Alloy Steel for 30 Years
PYRASTEEL for high temperatures
EVANSTEEL for strength

A big mouthful with every bite

In dirt, clay, coal, gravel or ore you can rely on one of the tough, properly designed, Brownhoist buckets to take a full load with every bite. Extra large sheaves reduce rope wear to a minimum. Brownhoist Buckets are available in rope-reeve, power-wheel and link type. For prices and further facts write INDUSTRIAL BROWNHOIST CORPORATION, Bay City, Michigan. Offices in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

BROWNHOIST BUCKETS
GIVE MORE YEARS OF
TROUBLE-FREE PERFORMANCE

quality of the equipment. This court said:

"The general rule is that, where express warranties covering the identical representations of the seller are inserted in the contract, the buyer is presumed to have relied upon the warranty and not upon the representation and can not, therefore, base a charge of fraud on the falsity of the representations."

TRAFFIC News Digest

I. C. C. Reports

Molding Sand.—No. 28956. American Radiator & Standard Sanitary Corporation v. A. T. & S. F. *et al.* By Examiner Alfred G. Haggerty. Dismissal proposed. A rate of $12 a net ton applied on shipments of molding sand, in carloads, during the period from August 20 to October 15, 1941, over all-railway routes from Albany, New York District to Richmond, California, found not unreasonable. Denial of reparation proposed. Despite the fact that the $12 rate was a combination over Chicago rather than a joint through rate, said the report, when tested by all the accepted and applied standards in prescribing rates on low-grade, heavy-loading, and low-value commodities, it was closer to a minimum than a maximum rate.

Mineral Wool.—I. and S. M-2139. Mineral wool from South Plainfield, New Jersey, to Massachusetts, Rhode Island and Connecticut. By division 2. Reduced motor common-carrier commodity rates proposed by Eastern Motor Freight Lines, Inc., on mineral wool from South Plainfield, New Jersey, to points in Massachusetts, Connecticut and Rhode Island, found just and reasonable; and the rule proposed in connection with such rates, providing a minimum weight on less-than-truckload shipments loaded to the capacity of the vehicle, unlawful. The rule is ordered cancelled on or before November 15 without prejudice to the establishment of a new rule in conformity with the views expressed in the report, and the proceeding discontinued. The rule should be revised so as to apply when the carrier supplies a vehicle of a certain minimum capacity large enough to accommodate 10,000 pounds of mineral wool in the forms here consid-

ered and having the usual shipping densities, said the report.

Brick.—No. 28946. Roanoke-Webster Brick Company, Inc. *et al.* v. Alabama Great Southern, *et al.* By Examiner Burton Fuller. Dismissal proposed. Tariff description of common brick in connection with interstate rates between points in Virginia and the southeast not shown to be vague or ambiguous nor to result in charges on the complainants' interstate shipments in violation of Sections 1 and 6 of the Interstate Commerce Act. It was stated in the report that the proceeding was heard jointly with the State Corporation Commission of Virginia, and that it was the tentative view of the latter that the assailed tariff description was vague and ambiguous and unlawful and that a new tariff description should be prescribed for future application.

Ton-Miles Above Last Year's

Class I railroads in the United States handled about 11 per cent. more ton-miles of revenue freight in August, 1943, than was handled in the corresponding month of 1942, a preliminary estimate prepared by the Association of American Railroads reveals.

In the first eight months of 1943 Class I railroads performed approximately 18 per cent. more revenue ton-miles of service than in the same period of 1942, 60 per cent. more than in the corresponding months of 1941, and 138 per cent. more than in the first eight months of 1939.

Central Freight Association

Docket 74249. (Carrier's proposal)—Stone, fluxing, furnace or foundry, melting or refractory, unburned, in bulk, in open-top cars, carload. Cancel rate of $1.16 per gross ton from Dewey and Kaylor, Pennsylvania, to Junction Transfer, 33rd Street Station, Pittsburgh, account obsolete. Rate published in B. & L. E., I. C. C. 1188. Classification basis to apply.

Docket 74245. (Shipper's proposal)—Stone, crushed, in open-top cars. Establish a rate of 99 cents per net ton from Kenton, Ohio, to Royal and Thorpe, Ohio.

Docket 74292. (Shipper's proposal)—Lime, common, hydrated, quick or slaked, carload. Minimum weight 30,000 pounds. Establish a rate of 16 cents, minimum weight 30,000; 13 cents, minimum weight 50,000 pounds; from Port Huron, Michigan, to Fort Wayne, Indiana.

Docket 74308. (Shipper's proposal)—Lake or river filling stone, carload. Minimum weight 90 per cent. of the marked capacity of the car, except that, when the car is loaded to its cubical or visible capacity, the actual weight will apply. Establish a rate of 70 cents per net ton from Stroud, Ohio to Cleveland, Ohio.

Docket 74309. (Shipper's proposal)—Lake or river filling stone, carload. Minimum weight 90 per cent. of marked capacity of car, except when car is loaded to cubical or visible capacity, actual weight will apply. Establish a rate of $1.39 per net ton from Stroud, Ohio to Erie, Pennsylvania.

Docket 74315. (Shipper's proposal)—Stone, fluxing, furnace or foundry, melting and or refractory, unburned, in bulk, in open-top cars, carload. Minimum weight 90 per cent. of the marked capacity of the car. Establish a rate of $1.16 per net ton from Bettsville, Maple Grove and Narlo, Ohio, to Pittsburgh, Pennsylvania, and points in the Pittsburgh area taking the same rates.

CHECK THESE NAYLOR PERFORMANCE ADVANTAGES

- Always accurate in diameter.
- Concentric ends match correctly.
- Easier to install.
- Holds true cylindrical form.
- Stays tight and leakproof.
- Stronger — safer.
- High salvage value.
- Light weight saves steel.
- Cuts maintenance costs.
- Saves money.

Sizes: 4" to 30" in diameter—all types of fittings, connections and fabrications.

POST-WAR VENTILATING JOBS CALL FOR NAYLOR

LIGHT-WEIGHT PIPE

There are three sound reasons why Naylor is the preferred pipe for push-pull ventilating service. It is light in weight. It is leaktight. And it is stronger, thanks to the exclusive Lockseam Spiralweld truss that runs the length of the pipe.

Add to these advantages the practical savings of Naylor lightweight pipe and you can see why so many experienced operators depend on this distinctive pipe for permanent as well as temporary ventilating lines.

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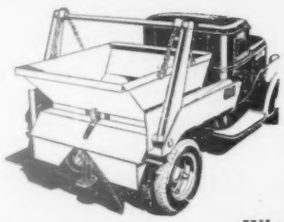
SPIRALWELD PIPE

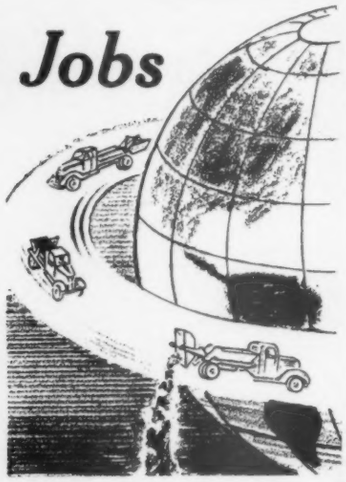
NAYLOR PIPE COMPANY
1257 East 92nd Street
Chicago 19, Illinois

Earth-Moving Jobs

CAN BE DONE FASTER, EASIER AND BETTER WITH BROOKS

LOAD LUGGER





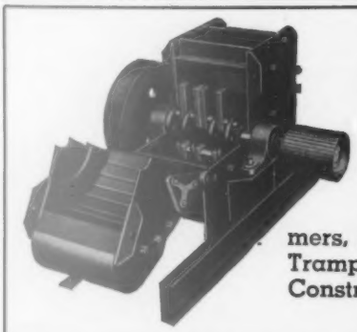
FEATURES:

Fits on standard truck chassis. Operates with 5 to 10 dump buckets. Only 15 seconds for loading or dumping. Saves time, conserves equipment and cuts maintenance costs.

Whether it is stripping over-burden, feeding crushers, road building, excavating, construction work, moving stock piles or other material-handling jobs . . . you can transport more yardage per day with less man-power and lower costs, when you use the LOAD LUGGER with a number of detachable dump buckets. It eliminates waste time of trucks waiting to be loaded, because you can haul and dump the buckets while the empties are being refilled on the job. Get the facts on this efficient method . . . ask for Catalog No. 44.

111 Davenport Road, Knoxville, Tenn.
Distributors in all Principal Cities

Brooks EQUIPMENT AND MFG. CO.



LET NEW HOLLAND HAMMER CRUSHERS INCREASE YOUR 1943 PRODUCTION ON FINER AGGREGATES AS WELL AS AGRICULTURAL LIMESTONE AND LOWER YOUR OPERATING COSTS. Features include Self Aligning Ball or Roller Bearings, Adjustable Hammers, Adjustable Breaker Plate, new design Tramp Iron Pocket and Welded Plate Steel Construction.

Write for Literature

NEW HOLLAND NH MACHINE CO.
NEW HOLLAND, PENNSYLVANIA

PERFORATED METAL SCREENS

FOR SAND, GRAVEL STONE, ETC.

Manufactured exactly to your specifications.

Any size or style screen, in thickness of steel wanted with any size perforation desired.
We can promptly duplicate your present screens at lowest prices.

Prompt Shipment

CHICAGO PERFORATING CO.
2435 W. 24TH PLACE CHICAGO, ILL.
Telephone CANAL 1459

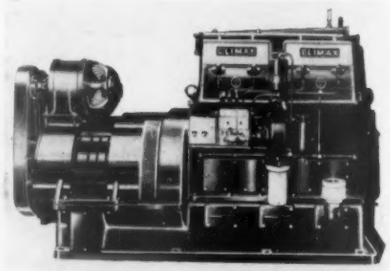
NEW MACHINERY and SUPPLIES

● Diesel Engines

The production of two solid-injection, compression-ignition engines has just been announced by Climax Engineering Company of Clinton, Iowa. These prime movers are additions to the company's extensive line of Blue Streak gas engines, 8 to 480 horsepower, generating sets, 300 watts to 312 kva., and complete accessory equipment.

Both new engines are 4-cycle, full Diesels and intended for use as light plants and primary drives for pumps, compressors, mills, mine and quarry equipment, marine service, etc.

Model D148 is a two-cylinder unit with a maximum rating of 22 horsepower.



New 4-cycle, full Diesel engine.

It may be equipped for pulley drive with or without clutch or clutch and reduction gear or auxiliary power take-off. As a Diesel-electric plant it may be direct connected, on a single base, with a 15-kva. generator.

Model D297 is a four-cylinder unit with a maximum rating of 44 horsepower. Drive equipment similar to Model D148 may be furnished. A special feature of D297, however, is that a flywheel, clutch, generator or marine gears may be installed on either or both ends, providing a radiator is not used. For electric power and light, the D297 may be used to power a 30 kva. generator.

Features include: one-piece crankcase and cylinder housing for rigidity and maintained alignment; replaceable chrome-nickel-iron cylinder liners for economical and infrequent maintenance; water-cooled exhaust manifold provides cool running under almost all conditions.

● Motor Control

The E-M Incher is a precise, quick, easy-to-use method of spotting, or slowly rotating, a 3-phase synchronous motor or slip-ring induction motor. Slow-motion, high torque rotation of the motor is provided electrically by using commutated direct current to supply a slowly revolving 3-phase "inching" current to the motor.

The Incher is particularly valuable in cement plants for spotting tube mills for recharging with rods or balls, and for other purposes.

"Nudging" or "inching" the motor with the starter is destructive to starter switches . . . turning the motor with an

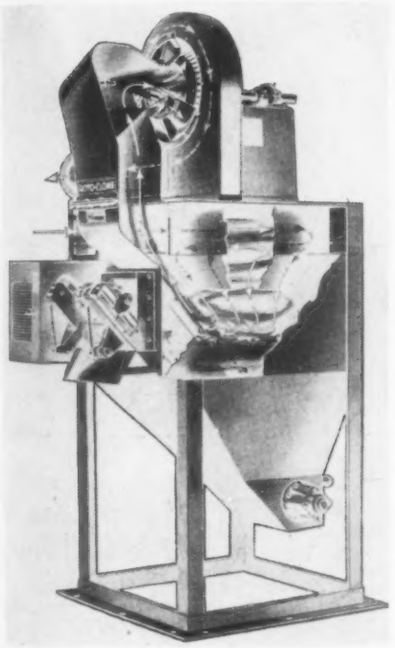
overhead crane or other mechanical device is clumsy and slow. The E-M Incher eliminates these methods, and is said to do the job quickly and efficiently. Also, since the Incher will revolve the motor in either direction, a reversing switch may be saved.

Full details of the E-M Incher may be had by writing the Electric Machinery Manufacturing Company, Minneapolis.

● Dust Collector

Effective control of dust in all types of crushing and screening operations is made possible with Type W wet-collection Roto-Clones made by the American Air Filter Company, Louisville.

These are dynamic precipitators in which the functions of exhauster and dust collector are consolidated in a single unit. Advantage of the centrifugal force



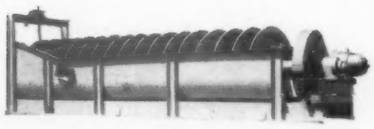
Phantom view of the dust collector.

imparted to the air stream is utilized to precipitate dust particles into a moving film of water on specially-shaped blades. Dust and water, as a thin slurry, are discharged through a separate passage while the cleaned air leaves in a manner similar to the conventional exhauster-housing outlet.

The impingement action traps all sizes of dust particles with high efficiency even where the material is difficult to wet. The water film between dust particle and blade counteracts the abrasive action of the collected material. No accumulations occur within the collector to reduce air flow.

● Screw Classifier

The Wemco screw classifier, a product of Western Machinery Company, San Francisco, classifies materials in wet grinding processes, desliming and dewatering, washing and sizing. Its mechanical simplicity, sturdy construction and high operating efficiency suits it to operations requiring the separation of solids into course and fine portions, as well as operations requiring removal of solids from a liquid pulp.



Screw for classifying sand, etc.

The action of the screw imparts a continuously applied pressure to the sands, accelerating the separation or dewatering. Both fine and course separations may be made. Wearing shoes attached to the helix are quickly changed. The flexibility of the classifier makes it adaptable to effective operation under many varying conditions.

● Excavator

Fast and rugged convertible excavators in ⅜- and ½-cubic yard sizes are among the improved models being offered by the Hanson Clutch & Machinery Company, Tiffin, Ohio.

These units are supplied either as truck shovels or as crawler-mounted units. Of full-welded steel construction, permanent alignment of gears, shafts and bearings is assured. All shafts and drums on the upper rotating base, regardless of the speed at which they operate, are mounted on anti-friction ball or roller bearings, reducing friction to a minimum.

The units are full revolving and may be had with gasoline or Diesel power.

SAND WASHING
TO EXACTING SPECIFICATIONS

Get Big Tonnage at Low Power Cost

with AKINS CLASSIFIERS

For many years AKINS Classifiers have been identified with the dressing of practically all metallic ores and have found many applications in other industries. More recently AKINS Classifiers have been successfully adapted to washing sands —particularly sands specified to close separation, as for glass making. . . . These machines do not require unloading to start after shutdown—a big advantage for plants not operating 24 hours a day. . . . In writing for Bulletin 24-HA, please state your washing problem.

A 54" High Weir Type AKINS Classifier specially equipped with wash boxes and lifter blades for washing sand.

Lowden Dryers; Skinner Multiple Hearth Roasters; Ball, Rod & Tube Mills; Smelting Equipment; Crushers and Rolls.

COLORADO IRON WORKS CO.

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Canadian Locomotive Co., Ltd., Kingston, Ont., Can. Clyde Engineering Co., Ltd., Granville, N.S.W. Head, Wrightson & Co., (So. Africa) Ltd., Johannesburg.
Vancouver Iron Works, Ltd., Vancouver, B.C., Can. Head, Wrightson & Co., Stockton on Tees, Eng.

The STAND-OUT LOADER

The HAISS "75" is everybody's idea of what a stockpile loader should be. Fast. Mobile. Rugged. Simple. Economical. Write for catalog.

ON WHEELS OR ON CREEPERS

HAISS QUALITY EQUIPMENT FOR 50 YEARS 1892 1942

GEO. HAISS MFG. CO., INC.

HAISS

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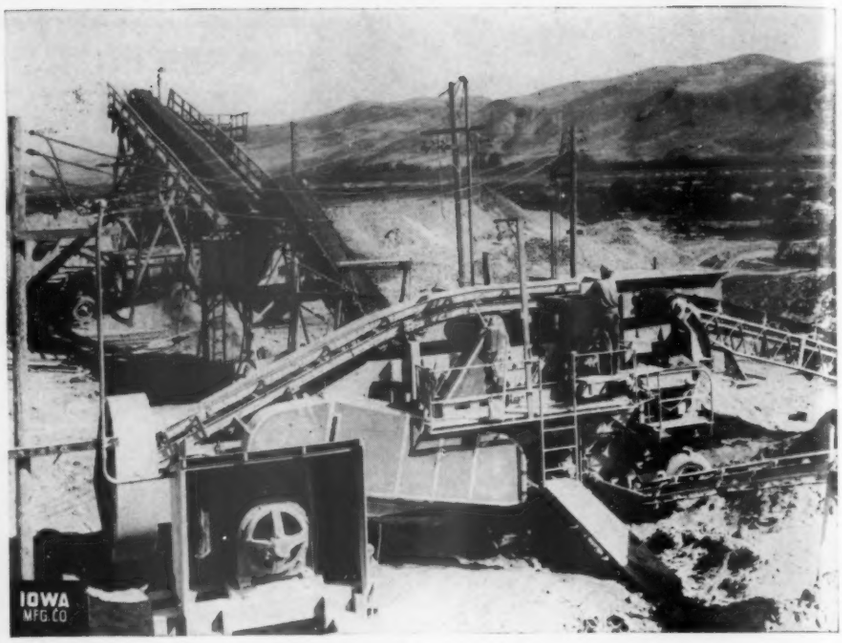
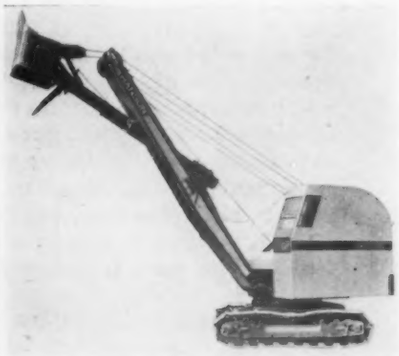


The tandem portable plant as set up on the job.

Hoist, swing and crowd clutches are of the Hanson patented internal-expansion booster type having large friction areas with single-point adjustment. It is possible to remove friction rings for relining without dismantling the shafts.

The powerful independent chain crowd, pioneered by Hanson, is the most dependable available.

The plant is unusual in that power losses and maintenance have been reduced to a minimum with a power transmission system which utilizes no chains, sprockets, or flat belts. Guarded multiple V-belts, universal shafts, inclosed oil-bathed gears, and anti-friction bearings are used throughout. Consequently,



Crawler-mounted convertible shovel.

● Portable Plant

Aggregate producers requiring high plant capacity and mobility will be interested in the Cedarapids master tandem portable crushing plant, built by the Iowa Manufacturing Company, Cedar Rapids, Iowa.

Highly mobile, this big plant meets all highway transportation requirements—is easily maneuvered. Overall traveling dimensions are only 33 feet long, 8 feet wide and 13 feet high. It rides on six cast disk wheels equipped with dual pneumatic tires, has four-wheel brakes, can be transported rapidly from job to job, and is swiftly set up and knocked down.

Engineered for smooth, efficient operation, the Master Tandem consists of matched-output jaw and roll crushers, screen and conveyors, which are perfectly balanced to eliminate any bottleneck in high capacity production.

PORTER "better built" Locomotives

Only PORTER Builds a Complete Line of Locomotives for Industry

DIESEL ELECTRIC
DIESEL MECHANICAL
STEAM
FIRELESS STEAM
ELECTRIC

ARMY E NAVY

H. K. PORTER COMPANY, Inc.
PITTSBURGH, PENNSYLVANIA

WHEN big producers, who have tried all the better makes of vibrating screens, swing over to Seco and replace with Seco exclusively, it really means something.

The reason . . . ? A rugged properly designed shaft assembly for durability and . . .

Fully controlled motion that eliminates "dead" areas and gives capacity with accurate screening.

SECO

VIBRATING SCREENS
SCREEN EQUIPMENT CO. INC.
'9 LAFAYETTE AVE., BUFFALO, N. Y.

only 125 to 150 horsepower is required to operate the plant at peak capacity.

The master tandem plant handles material in a continuous flow from shovel to truck or storage. From a 30-inch by 50-foot feed conveyor, material drops to a 30-inch feeder, which delivers it to a 4- by 12-foot Cedarapids double-deck horizontal vibrating screen. The largest oversize goes to a 10- by 36-inch jaw crusher, the next oversize moving to a 40- by 20-inch roll crusher. Fines fall through to a sand conveyor and graded aggregate to an aggregate-delivery conveyor. Material from the roll and jaw crushers drops onto a 24-inch by 14-foot conveyor which carries it to a "raff wheel" for elevation to a 24-inch by 25-foot conveyor. Crushed material is then returned to the vibrating screen for grading.

Trade Literature

ARCHITECTURAL CONCRETE SLABS, 28 pages. Universal Atlas Cement Company, New York City.

WORTHINGTON EE DIESEL ENGINES, 16 pages. WORTHINGTON ALL-SPEED DRIVE, 4 pages. Worthington Pump & Machinery Corporation, Harrison, New Jersey.

MANGANESE STEEL FOR MINING AND QUARRYING EQUIPMENT, 60 pages. Amsco Division, American Brake Shoe Company, Chicago Heights, Illinois.

THE NEW FAIRBANKS-MORSE PROTECTED POLYPHASE SQUIRREL-CAGE MOTOR, 12 pages. Fairbanks, Morse & Company, Chicago.

LUBRICATING OIL PURIFIERS AND RECLAIMERS, 6 pages. Youngstown Miller Company, Sandusky, Ohio.

BELT CONVEYORS BY CONTINENTAL, 20 pages. Continental Gin Company, Birmingham.

WESTCO INDUSTRIAL PUMPS, 60 pages. Joshua Hendy Iron Works, Pomona Pump Division, St. Louis.

OPERATION AND MAINTENANCE OF MAGNETIC PULLEYS, 40 pages. Dings Magnetic Separator Company, Milwaukee.

TRADE NOTES

The Industrial Brownhoist Corporation, Bay City, Michigan, has moved its Cleveland sales office to 1812 Terminal Tower. Sales offices are also maintained in New York, Philadelphia, Pittsburgh, Cleveland and Chicago.

Steel circular products, including crane wheels, car wheels, sheaves, chain and conveyor-idler rollers, are available from the Farrell-Cheek Steel Company, Sandusky, Ohio. A new booklet entitled, "Finest Circular Steel Products for Industry", describes these products and can be obtained by writing the company direct.

Controlling stock of the Insley Manufacturing Company, power-shovel manufacturer, has been acquired by W. B. Elliott, head of the W. B. Elliott Company, Chicago distributor. No change in the operating functions or personnel of either concern is planned.

The St. Regis Paper Company of New York has recently completed plans for the immediate erection of a new multiwall paper-bag manufacturing plant in North Kansas City, Mo. The building contract has been awarded to the North Kansas City Development Company. Construction will start at once and the plant will be in full operation early in 1944, equipped to make sewn, pasted, valve and open-mouth bags and shipping containers, as well as small flour bags and sugar pockets.

Producers of cement and other stone products in the area will benefit by the convenient location of the new St. Regis plant. Within the area served by the Kansas City plant there are 64 producers of cement, limestone and similar building materials. Greatly reducing siftage loss, one-trip multiwalls afford increased protection in transit and storage and clean, dust-free storerooms.

The Hayward Company, New York, has published three new booklets on the care of Hayward orange-peel, clam-shell and electric-motor buckets. Although these wartime guides are particularly intended for users of Hayward products, they contain a wealth of timely information and helpful suggestions that will prove invaluable in the proper care and maintenance of practically any make of bucket.

Depend on
MURPHY DIESEL
Reg. U.S. Pat. Off.
GENERATOR SETS
and ENGINES
for MORE POWER • MORE PROFITS
MURPHY DIESEL Generator Sets provide dependable power for continuous 'round-the-clock, heavy-duty service. Rugged, compact, simple to operate, these low-cost producers of power have won many friends through years of reliable service on a wide variety of installations. Put Murphy Diesel Engines and Generator Sets to work for you, for "More Power, More Profits."
GENERATOR sizes: 60 to 115 KW, AC or DC; ENGINE sizes: 90 to 215 HP. Write for complete information.
MURPHY DIESEL COMPANY, 5307 W. Burnham St., Milwaukee, Wis.
Buy U. S. War Bonds

FARREL BACON CRUSHERS

Complete plants designed and equipped, including Screens, Elevators and Conveyors. Machinery for Mines and Rock Quarries, Sand and Gravel Plants. Engineering Service.

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BUILDERS *Toledo Chronoflo*

CONVEYOR WEIGH METERS

Dependable equipment for *accurately* weighing and/or blending gravel, cement, crushed rock, limestone or sand, *in transit*, on conveyor belts. Write to Builders-Providence, Inc. (Division of Builders Iron Foundry), 9 Codding St., Providence, 1, R. I. for Bulletin 322.

Sincerely Yours,
BUILDERS-PROVIDENCE

● Opens Laboratory

The Eimco Corporation, Salt Lake City, manufacturers of filters for cement slurry, other filtration equipment and mining machinery, is installing a branch laboratory at its central district offices located at 111 West Washington Street, Chicago. The new laboratory, when completed, will be in a position to make filtration tests of samples for prospective users of such equipment without cost or obligation. Equipment includes vacuum pumps, test leaves, agitators and various filter cloths. The Chicago office was established in 1938. P. O. Richter is in charge.

STATEMENT OF OWNERSHIP

Statement of the ownership, management, circulation, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of PIT AND QUARRY, published monthly at Chicago, Illinois, for October 1, 1943.

State of Illinois, County of Cook, *ss.*

Before me, a notary public in and for the state and county aforesaid, personnaly appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the business manager of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the act of August 24, 1912, as amended by the act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Complete Service Publishing Company, Chicago, Ill.; Editor Stanley A. Phillips, same; Managing Editor, Stanley A. Phillips, same; Business Manager, H. W. Baumgartner, same.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent. or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given).

Complete Service Publishing Company, Chicago, Ill.

H. W. Baumgartner, same.
Ida A. Baumgartner, same.
Stanley A. Phillips, Evanston, Ill.
Florence S. Phillips, Evanston, Ill.
James E. Montgomery, same.
Evelyn W. Montgomery, same.
Lanetta B. Smith, same.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent. or more of the total amount of bonds, mortgages, or other securities are: (If there are none, so state.) None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

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NOVEMBER, 1943

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The CONCRETE MANUFACTURER

NOVEMBER, 1943

A SPECIAL SECTION OF PIT AND QUARRY DEVOTED TO PRODUCTION MARKETING AND USES OF CONCRETE PRODUCTS AND READY - MIXED CONCRETE

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Ordinance Imposes Concreting Fees

Ready-mixed-concrete producers, or other contractors who "furnish, mix or lay sidewalks, curbs or driveways" in the town of Teaneck, New Jersey, hereafter will be required to pay a license fee of $10 and a fee of $5 per 50 lineal feet of such work following passage of an unusual ordinance by that municipality recently. Other interesting regulations are contained in the ordinance which follows:

"Section 1. No concrete curb, sidewalk or driveway shall be laid or repaired within the confines of any public street in the Township of Teaneck unless the same is of the quality specified herein and is laid by a duly licensed person or corporation.

"Section 2. Any person desiring to lay or repair a concrete curb, sidewalk or driveway within the Township of Teaneck shall first apply for a permit therefor from the Superintendent of Public Works, which permit shall specify the lot and block, where the work is to be done, the owner of the lot and block, and by whom the work shall be done.

"Section 3. All concrete sidewalks and driveways shall be placed on a bed of cinders, not less than 4 inches deep after compaction. The sidewalk shall be 4 inches and driveways 6 inches in depth, built in one course, and of a concrete which will show a compressive strength of 3000 pounds per square inch after twenty-eight days, when tested under standard conditions.

"Section 4. Both sidewalks and driveways shall be properly divided into blocks five feet long, completely separated from the adjoining blocks.

"Section 5. Concrete curbs shall be six inches wide on top, nine inches at the bottom, and eighteen inches in depth, the vertical face shall be at the back of the curb. They shall be divided into sections not longer than ten feet, and shall be built of a concrete which will show a compressive strength of 3000 pounds per square inch after twenty-eight days, when tested under standard conditions.

"Section 6. Concrete shall not be placed in curb or sidewalk forms until the forms have been inspected and approved for line, grade and depth by an authorized Township inspector.

"Section 7. The contractor, or person in chage of pouring any concrete, shall notify the Department of Public Works of the Township of Teaneck while pouring any concrete so that a sample of the concrete may be taken.

"Section 8. The Township shall have the sample tested by a reputable testing laboratory after twenty-eight days, and if the results show a compressive strength of less than 3000 pounds per square inch, the conrtactor, as well as the person or firm furnishing the concrete, may be summoned to appear before the Township Manager to show reasons why their license shall not be revoked. One such sample shall be taken for not more than every hundred feet of curb or sidewalk.

"Section 9. Every person, firm or corporation laying concrete curbs, sidewalks or driveways shall imbed or imprint therein by means of a metal plate or otherwise, the name of the contractor doing the work, and the month and year in which the work was completed. Such imprint shall be placed on each job and not more than 100 feet apart.

"Section 10. The concrete shall be placed in a workmanlike manner with a smooth wood float finish, and shall be properly cured and protected against sun and frost.

"Section 11. No individual, firm or corporation shall furnish, mix or lay concrete on the streets or public places of the Township of Teaneck unless he shall have a license from the Township of Teaneck. Such license shall be issued by the Department of Public Works, approved by the Superintendent thereof, and countersigned by the Municipal Manager. In the granting of such licenses for the first time, cognizance shall be taken of the reputation of the applicant, the character of the work he has done, and his plant and equipment for doing such work hereafter. Such license shall be issued for one year from January 1st to January 1st, and a full year's fee shall be paid irrespective of the time of the year when the license is taken out. Such license shall be subject to revocation, after a hearing before the Municipal Manager, because the material furnished or work done is not in accordance with this ordinance, or for failure to repair any defective work, after due notice thereof has been given.

"Section 12. License fees—a fee shall be charged for a permit for each individual job at the rate of Five ($5.00) Dollars per fifty feet of frontage along which sidewalk and curb, or both, are laid, said fee to cover the cost of inspection and tests. A license fee of Ten ($10.00) Dollars shall be charged to each individual, firm or corporation for a license to lay concrete curbs, sidewalks or driveways in the Township of Teaneck.

"Section 13. Penalties—Any person, firm or corporation violating any of the provisions of this ordinance shall, upon conviction thereof, be subject to a fine not exceeding Two Hundred ($200) Dollars, or imprisonment in the County Jail not exceeding ninety days, or both fine and imprisonment for each and every violation."

Wins Citation

Officials and employees, 225 of them, at the Stearns Manufacturing Company, Adrian, Michigan, are jubilant over the receipt of a special citation from the ordnance department industry integration committee for tank tracks.

Last May the company received the treasury bullseye and coveted Army and Navy "E."

EFFECT OF TIME OF HAUL ON THE STRENGTH AND CONSISTENCY OF READY-MIXED CONCRETE*

By GLENN C. COOK
American Builders Supply Company, Louisville

THE effect of the time of haul on the strength and consistency of concrete has been of interest to the ready-mixed-concrete industry since its beginning. Information on that factor has been needed as a basis for specifications. Further, a truck is often delayed due to road conditions or a breakdown of either the operator's or the contractor's equipment, and it is important to know just how much delay may occur before the concrete is unfit for use.

A number of tests of the effect of the length of haul have been made, but none in recent years. A list of some of the more pertinent literature on the subject is appended hereto. That literature records the data on which current specifications and industry practices are based. The question has arisen as to whether these earlier tests, in view of changes in the characteristics of cement and changes in equipment, are still pertinent. A series of tests was planned to provide information pertinent to that question.

Test Program Tests were made on concrete mixed in a stationary mixer and hauled over the streets of Louisville in a truck-mixer-agitator. The route presented average street and traffic conditions. Samples for testing were taken at about 30-minute intervals until the concrete became quite stiff. The time of haul ranged from slightly more than 2 hours to more than 7 hours.

Two groups of tests were made. Each group consisted of three batches of concrete, each made on a different day. The first group was made in late March and early April when air temperatures as low as 38 degrees F. were encountered; the second group was carried out in early July during a period when the air temperature was as high as 93 degrees F.

The concrete was made with cement and aggregates from the source of supply normal for the American Builder's Supply Company. The cement was a standard Portland cement. The aggregates were sand and gravel from the Ohio River, used in a stream-wet condition; the gravel had a maximum size of 1 inch. The concrete was proportioned to contain approximately 5 sacks of cement per cubic yard and a slump of 4 to 5 inches. Each batch consisted of 3 cubic yards, which was mixed for 2 minutes in an 84S Smith tilting mixer before being discharged into the truck-mixer-agitator.

The truck-mixer-agitator was a Jaeger horizontal type with a 135-cubic foot drum having a capacity of about 2¾ cubic yard as a mixer and 4 cubic yards as an agitator. During the hauling the drum was rotated at 4 r.p.m. The truck-mixer drum was in first-class condition. After the truck was loaded and before the hatch was closed, a sample of 1 to 2 cubic feet was taken. It consisted of a mixture of smaller samples taken through the hatch by means of a post-hole digger from different locations in the batch. Care was exercised to make the combined sample as nearly representative of the batch as feasible. After the first sample was taken the truck was driven over the prescribed route and returned to the point of sampling within about 30 minutes, when another sample was taken. This procedure was repeated until the concrete became quite stiff. Samples of aggregates for sieve analyses, unit weights and for moisture and specific-gravity determinations were taken as they were being weighed for the batch.

For each sample of concrete slump tests and three 6 by 12-inch cylinders for compression tests at 28 days were made. The cylinders were molded according to A.S.T.M. standards. They were cured immersed in water at room temperature until tested. For the first and the last samples of each batch wash analyses by the Dunagan method were made. Also, for certain of the samples in Group 1 a portion of the sample was retempered to the original slump and cylinders were made for strength tests. Periodic measurements of air temperature, concrete temperature and relative humidity were made.

Table I.—MISCELLANEOUS TESTS OF AGGREGATES
Tests of samples secured as aggregates were being weighed for concrete batches.

Batch No.	Material	Percentages Finer Than Each Size							Specify Gravity	Unit Weight Lb. Per Cu. Ft.
		100	50	30	16	4	½ In.	1 In.		
Group 1										
1	Sand	0.5	7.3	59.0	84.4	100	.....	.....	2.64	108.0
2	Sand	0.5	5.9	57.4	76.0	100	.....	.....	2.60*	110.0
3	Sand	0.5	5.8	55.0	77.3	98.4	.....	.....	2.64	109.0
Avg.		0.5	6.3	57.1	79.2	99.5			2.63	109.0
1	Gravel	.....	.....	.....	.....	0	55	100	2.68	104.7
2	Gravel	.....	.....	.....	.....	2	62	99	2.67	107.3
3	Gravel	.....	.....	.....	.....	1	58	100	2.68	106.0
Avg.						1	58	100	2.68	106.0
Group 2										
4	Sand	0.4	6.0	47.6	70.4	98.6	.....	.....	2.64	110.0
5	Sand	0.0	4.6	34.8	71.8	99.6	.....	.....	2.64	109.0
6	Sand	0.2	7.1	37.9	69.3	98.8	.....	.....	2.64	107.5
Avg.		0.2	5.9	40.1	70.5	99.0			2.64	108.8
4	Gravel	.....	.....	.....	.....	0.2	46.6	86.3	2.68	107.1
5	Gravel	.....	.....	.....	.....	0.2	43.8	92.0	2.68	107.7
6	Gravel	.....	.....	.....	.....	0.4	45.7	90.2	2.68	105.5
Avg.						0.3	45.3	89.5	2.68	106.8

*Doubtful value.

*Based on paper presented at annual convention, National Ready Mixed Concrete Association, Cleveland, January 27-29, 1943 and published in *Journal* of the American Concrete Institute, Vol. 14, No. 5 (April, 1943).

Table II.—BATCH WEIGHTS

Weights of aggregate on dry basis; weight of water includes surface moisture of aggregates.

Batch No.	Weight in Lb.				Water Ratio by Volume
	Cement	Sand	Gravel	Water	
Group 1					
1	1,410	4,176	5,940	1,004	1.07
2	1,410	4,176	5,940	935	1.00
3	1,410	4,176	5,940	950	1.01
Avg.	1,410	4,176	5,940	963	1.03
Group 2					
4	1,410	4,755	5,362	908	0.97
5	1,410	4,176	5,940	904	0.96
6	1,410	4,176	5,940	920	0.98
Avg.	1,410	4,369	5,747	911	0.97

Professor D. V. Terrell, head, Department of Civil Engineering, University of Kentucky, and Stanton Walker, director of engineering, National Ready-Mixed Concrete Association, assisted in planning the test program. Mr. Walker observed the conduct of one day's tests in detail and he also coöperated in the compilation and organization of the data.

Professor W. B. Wendt, head, Department of Civil Engineering and Professor W. R. McIntosh, professor of civil engineering, University of Louisville, coöperated in the conduct of the test program. One or the other of these men was present at the plant at some time on each day on which tests were made and they had a representative present throughout the investigation. All the strength tests were made by Professors Wendt and McIntosh.

Discussion of Data

The data are summarized in Table I to VII and Figures 1 to 4. While the basic data are given in sufficient detail to enable the reader to analyze them as he wishes, the writer's summaries are directed principally to the following factors:

(a) Information on aggregate and proportions (Tables I and II).

(b) Effect of the time of haul on strength (Figure 1 and Tables III and IV).

(c) Effect of the time of haul on slump (Figure 2 and Tables III and IV).

(d) Influence of temperature on slump (Figure 3).

(e) Effect of the time of haul on grinding (Table V).

(f) Effect of retempering (Tables VI and VII and Figure 4).

Materials.—The standard Portland cement was taken from the same bin for both groups of tests. Tests of 18 samples by H. C. Nutting Company showed the following average results: specific surface, 1,930; 7-day tensile strength, 400 p.s.i.; 28-day tensile strength 520 p.s.i.; initial set, 3½ hours; final set, 5 hours 33 minutes; sulphuric anhydride, 1.48 per cent.; magnesia, 3.58 per cent.; loss on ignition 0.61 per cent.; insoluble residue, 0.06 per cent. The sieve analyses, specific gravities and unit weights of the sand and gravel are given in Table I. As already pointed out, the samples were taken at the time the concrete was batched. Only one sieve analysis was made for each batch for the sample thus secured. It is to be observed that both the sand and the gravel were somewhat coarser for the Group 2 tests than for those of Group 1.

Table III.—EFFECT OF TIME OF HAUL (GROUP I—LOW TEMPERATURES)

Slumps are averages of two determinations; strengths are averages of three values, except those marked with asterisk which are averages of two.

Item	Data for Different Times of Haul													
	0	34	66	98	132	167	203	240	271	307	334	375	405	436
Batch No. 1														
Relative humidity (per cent)	80	63	35	33	28	.....	.....	.....	.....	.....	.....	.....	.....	.....
Air temperature (deg. F.)	48	50	64	66	69	72	73	.....	74	.....	75	.....	.....	.....
Concrete temperature (deg. F.)	58	60	62	64	64	68	72	.....	78	.....	82	.....	.....	.....
Slump (inches)	4.2	4.0	3.2	2.5	2.2	1.8	1.4	.....	0.6	.....	0.1	.....	.....	.....
Compressive strength (p. s. i.)	4,300	4,240	4,320	4,140	3,760	3,970	3,900	.....	4,230	.....	3,720	.....	.....	.....
Batch No. 2														
Relative humidity (per cent)	75	67	62	62	51	53	46	42	41	38	.....	43	.....	36
Air temperature (deg. F.)	38	40	42	42	44	46	47	48	48	50	.....	50	.....	53
Concrete temperature (deg. F.)	54	54	55	56	56	56	58	58	59	60	.....	62	.....	60
Slump (inches)	5.1	4.5	4.1	3.4	4.0	2.9	2.9	2.4	1.7	2.0	.....	1.3	.....	1.1
Compressive strength (p. s. i.)	3,930	4,100	3,940	4,280	4,120	4,270*	3,910	4,130	3,830	3,910	.....	3,980	.....	3,870
Batch No. 3														
Relative humidity (per cent)	75	62	62	71	62	61	52	45	45	.....	41	.....	39	.....
Air temperature (deg. F.)	40	42	44	44	46	47	50	51	52	.....	53	.....	54	.....
Concrete temperature (deg. F.)	52	52	53	54	54	56	58	58	58	.....	60	.....	60	.....
Slump (inches)	5.0	4.7	4.7	4.5	4.6	3.1	3.9	2.5	2.4	.....	1.4	.....	1.4	.....
Compressive strength (p. s. i.)	3,960	4,170	4,040	4,030	4,070	3,960	3,820	3,980	3,860	.....	3,860	.....	4,030*	.....
Average of Batches 2 and 3 (Similar Temperature Conditions)														
Relative humidity (per cent)	75	64	62	66	56	57	49	44	43	.....	41	43	39	36
Air temperature (deg. F.)	39	41	43	43	45	46	48	50	50	50	53	50	54	53
Concrete temperature (deg. F.)	53	53	54	55	55	56	58	58	59	60	60	62	60	60
Slump (inches)	5.0	4.6	4.4	3.9	4.3	3.0	3.4	2.5	2.0	2.0	1.4	1.3	1.4	1.1
Compressive strength (p. s. i.)	3,940	4,140	3,990	4,160	4,100	4,110	3,860	4,060	3,840	3,910	3,860	3,980	4,030	3,870
Average of Batches 1, 2 and 3														
Relative humidity (per cent)	77	64	53	55	47	.....	.....	.....	.....	.....	.....	.....	.....	.....
Air temperature (deg. F.)	42	44	50	51	53	55	57	.....	58	.....	.....	.....	.....	.....
Concrete temperature (deg. F.)	55	55	57	58	58	60	63	.....	65	.....	.....	.....	.....	.....
Slump (inches)	4.8	4.4	4.0	3.5	3.6	2.6	2.7	.....	1.6	.....	.....	.....	.....	.....
Compressive strength (p. s. i.)	4,060	4,170	4,100	4,150	3,980	4,060	3,880	.....	3,970	.....	.....	.....	.....	.....

Proportions. — The proportions (producing approximately 5 sacks of cement per cubic yard of concrete) are tabulated in Table II. It will be observed that the same proportions of dry materials were used for all batches except No. 4. On that day a full batch was mixed in the usual proportions but it was obviously granular and unworkable and it (3 cubic yards) was discarded. The reason for the lack of workability appeared to be an excess of the intermediate gravel sizes, although that condition is not clearly revealed by the sieve analyses. At any rate another batch with a higher proportion of sand was substituted.

The quantity of mixing water shown in Table II is reasonably uniform for each group of tests. The amount of added water is known accurately. The accuracy of the calculation of total water depended upon, of course, the accuracy with which the moisture sample was representative of the batch as a whole.

Strength.—The effect of length of haul on strength is summarized in Figure 1. The detailed data are given in Tables III and IV. Where the same time of haul is given for different batches it is accurate to within at least 2.5 per cent. or 2.5 minutes. That is to say, for each group of tests, the times of haul within 5 minutes, or within 5 per cent. of each other, whichever was the greater, were averaged to facilitate tabulation.

Figure 1 demonstrates clearly that for the conditions of these tests there was no detrimental effect on strength for any normal length of haul. In fact, within the 90-minute limit of the A.S.T.M. specification, a limit common in other specifications, substantially all the strengths after haul were higher than the initial strengths. Further, it is most important to note that for excessive hauls, continued until the concrete had attained an excessively low slump, only isolated reductions of strength in excess of 10 per cent. were obtained; there were only 2 cases (both from the same batch) outside the 10 per cent. band and comparisons of these values with companion ones suggest that one of them was more than likely due to errors of sampling, molding or testing.

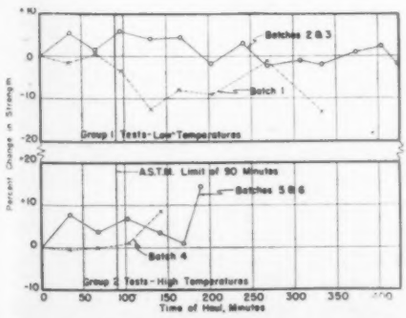
Batches 2 & 3
Batch 1
Group 1 Tests - Low Temperatures
A.S.T.M. Limit at 90 Minutes
Batches 5 & 6
Batch 4
Group 2 Tests - High Temperatures
Percent Change in Strength
Time of Haul, Minutes

Figure 1—Effect of time of haul on strength.

Table IV.—EFFECT OF TIME OF HAUL (GROUP 2—HIGH TEMPERATURES)
Slumps are averages of two determinations; strengths are average of three values.

Item	Data for Different Times of Haul						
	0	34	68	101	136	168	180
Batch No. 4							
Relative humidity (per cent)	67	62	60	58	50	.....	.....
Air temperature (deg. F.)	87	90	90	90	93	.....	.....
Concrete temperature (deg. F.)	84	84	94	96	98	.....	.....
Slump (inches)	4.9	3.9	3.2	2.2	0.7	.....	.....
Compressive strength (p. s. i.)	3,700	3,680	3,690	3,740	4,020	.....	.....
Batch No. 5							
Relative humidity (per cent)	53	54	57	57	57	57	.....
Air temperature (deg. F.)	66	68	70	71	71	72	.....
Concrete temperature (deg. F.)	72	76	78	78	80	80	.....
Slump (inches)	4.2	4.0	2.4	2.0	1.5	1.2	.....
Compressive strength (p. s. i.)	4,180	4,550	4,220	4,560	4,440	4,440	.....
Batch No. 6							
Relative humidity (per cent)	76	71	62	57	65	.....	65
Air temperature (deg. F.)	70	70	72	72	72	.....	72
Concrete temperature (deg. F.)	70	72	78	80	82	.....	84
Slump (inches)	5.0	4.5	3.6	2.1	1.6	.....	0.8
Compressive strength (p. s. i.)	4,610	4,920	4,900	4,720	4,860	.....	5,040
Average of Batches 5 and 6 (Similar Temperature conditions)							
Relative humidity (per cent)	64	62	60	57	61	57	65
Air temperature (deg. F.)	66	69	71	72	72	72	72
Concrete temperature (deg. F.)	71	74	78	79	81	80	84
Slump (inches)	4.6	4.2	3.0	2.0	1.6	1.2	0.8
Compressive strength (p. s. i.)	4,400	4,740	4,560	4,690	4,550	4,440	5,040
Average of Batches 4, 5 and 6							
Relative humidity (per cent)	65	62	59	57	57	.....	.....
Air temperature (deg. F.)	74	76	78	78	79	.....	.....
Concrete temperature (deg. F.)	75	77	83	85	87	.....	.....
Slump (inches)	4.7	4.1	3.1	2.1	1.3	.....	.....
Compressive strength (p. s. i.)	4,160	4,380	4,270	4,340	4,370	.....	.....

Slump.—Figure 2 indicates that there was a gradual, but consistent, decrease in slump from the beginning of the haul. See also the detailed data in Tables III and IV. The rate of that decrease in slump seemed to be affected principally by the temperature of the concrete, and to some extent by the relative humidy of the air, as will be discussed later. For the early spring tests (Group 1), the slump was reduced about 1 to 1½ inches from the original 4 to 5 inches during a 90-minute haul; for the summer tests (Group 2) the reduction was about 2½ inches.

However, it should be emphasized that these reductions in slump were not accompanied by corresponding reductions in workability or placeability. Unfortunately no method for measuring actual workability was (or is) available and the preceding statement must be based on visual observation. As the concrete was hauled it took on a more "fatty" and more plastic appearance and "feel," which did much to compensate for, if in fact it did not completely compensate for, the loss in slump for hauls of usual length.

It has been suggested that this increase in apparent plasticity might be due to grinding of the aggregates and the cement. Such action may offer a partial explanation. However, for these tests, as will be discussed later, it is believed that grinding was a minor and, perhaps, negligible factor. A principal factor is believed to be the absorption of the mixing water by the cement and the better incorporation of the water with the cement. As already pointed out, the aggregates were "stream-wet" and, therefore, absorbed no water.

Table V.—SUMMARY OF DUNAGAN WASH ANALYSES
Each result is average of three tests.

Test No.	Length of Haul (Min.)	Percentage of Solids by Weight								
		— No. 100			No. 100-to-No. 4			+ No. 4		
		Batch*	Begin	End	Batch*	Begin	End	Batch*	Begin	End
1	327	12.2	11.9	13.4	36.2	35.2	33.9	51.6	52.9	52.7
2	436	12.2	11.8	12.8	36.2	35.6	36.5	51.6	52.6	50.7
3	405	12.2	11.9	12.4	36.2	36.5	35.9	51.6	51.6	51.7
Avg.		12.2	11.9	12.9	36.2	35.8	35.4	51.6	52.3	51.7
4	135	12.2	11.8	11.6	41.2	39.1	37.5	46.6	49.1	50.9
5	168	12.2	12.3	12.0	36.2	35.4	34.8	51.6	52.3	53.2
6	180	12.2	11.6	12.2	36.2	31.4	29.8	51.6	57.0	58.0
Avg.		12.2	11.9	11.9	37.9	35.3	34.0	49.9	52.8	54.0
Grand Average...		12.2	11.9	12.4	37.0	35.5	34.7	50.7	52.5	52.8

*Materials as weighed into batch, uncorrected for sieve analyses.

Temperature versus Slump. — Casual inspection of the data indicate the rate of decrease of slump to be greatly affected by temperature. That suggested the possibility of a relationship such as shown in Figure 3, where the decreases in slump for each batch and each period of sampling are plotted in relation to a "degree-hours" factor. The "degree-hours" were calculated by multiplying the average temperature of the concrete by the time of haul. For example, if the concrete started out at 58 degrees F., was 60 degrees after 34 minutes, and 62 degrees after 66 minutes, the "degree-hours" were calculated as

$$\frac{58 + 60 + 62}{3} \times \frac{66}{60} = 66,$$

which seems to be a sufficiently accurate short cut to suggest the relationship.

While the data are somewhat scattered, they arrange themselves in such a manner as to clearly demonstrate that a relationship exists. While the slope of the curve would undoubtedly vary with materials and equipment, it suggests that individual relationships might be worked out for different conditions of individual operations.

Some effect of humidity may be observed from Tables III and IV, the tendency being for the slumps to decrease more rapidly on drier days. However, attempts to correct the "degree-hours" factors for humidity to obtain a better relationship with slump were only moderately successful. It should be pointed out that humidity should be expected to have a greater effect on these tests than on normal operations, since the batch to the mixer drum was removed every 30 minutes for the purpose of taking samples.

Grinding.—An attempt to develop information on the amount of grinding which takes place during agitation was made by means of "Dunagan analyses" and using the equipment developed by the late Professor Dunagan. For the first and last sample of each batch separations were made, by washing, at the No. 100 and No. 4 sieves. The results are summarized in Table V. The —No. 100, the No. 100-to-No. 4 and the + No. 4 material are expressed as percentages by weight of the total *solid* ingredients. For the record, and for purposes of comparison, the original batch weights are also given expressed in the same manner.

The results of the "Dunagan analyses" are sufficiently consistent to lead to confidence in their "order-of-magnitude" accuracy. On the other hand, the differences between the results before and after hauling are so small, and so erratic within the small range, that they do not make possible a quantitative measuring of the grinding. Almost any of the differences encountered might have resulted from normal variations in sampling. The data do suggest, however, that the amount of grinding was small.

Taking the averages of the three batches for each group, and taking the figures at their face value, it can be reasoned that, in the case of Group 1 tests, where the time of haul averaged about 6½ hours, sufficient sand and gravel were ground to increase the —No. 100 portion of the batch about 8½ per cent.—an increase of only 2.8 per cent. in the "fines" in the sand.

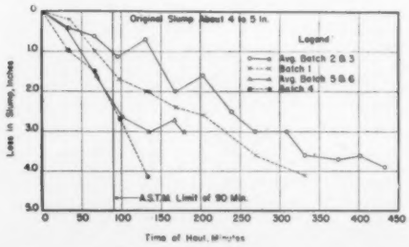

Figure 2—Effect of time of haul on slump.

Similar reasoning would indicate that no grinding to the —No. 100 sizes took place for the Group 2 tests, where the average length of haul was about 2½ hours. However, at least one inconsistency presents itself to detract from confidence in the results, or, more accurately, from confidence in the applicability of the procedure for the purpose; in the Group 2 tests the amount of + No. 4 material appeared to increase slightly, which could only result from differences in samples.

Retempering.—Retempering tests were made only in Group 1. For three samples from each of the three batches, water was added to a portion of the sample and it was remixed by hand. Sufficient water was added to restore the original slump. No retempering was done by adding water to the mixer drum. The results are summarized in Tables VI and VII and Figure 4.

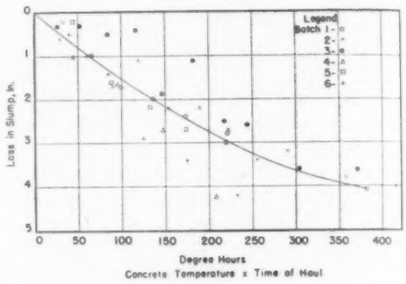

Figure 3—Effect of temperature on reduction of slump.

The reductions in strength due to retempering were considerably less than would be expected under normal circumstances from the amount of water added. The writer has speculated as to the reasons for that discrepancy without arriving at a satisfactory answer; it is too consistent to be an accident, since it occurred for each of the three tests of three different batches—9 tests in all. While the drum was watertight and substantially air-tight, the explanation may lie in the loss of water by evaporation during sampling.

It will be seen from Table VII that the average amount of water added was 14 per cent. and the average decrease in strength was 10 per cent. That additional water would be expected, from normal water-ratio-strength relations, to reduce the strength about 24 per cent. Further, it will be observed that the average total reduction in strength from the sample with "no haul" to the retempered sample after an

average haul of about 5 hours was only 13 per cent. These relationships are brought out in better detail in Figure 4.

Conclusions The following conclusions appear to be justified by these tests for ready-mixed concrete made with a normal Portland cement and stream-wet sand and gravel aggregates of the nature of those available in the Ohio River at Louisville, and transported in a standard truck-mixer with the drum revolving at 4 r.p.m.

1. Lengths of haul within normal specification limits result in no reduction in strength; generally a slight increase occurs.

2. Excessive lengths of haul, continued until the concrete is quite stiff, result in strength losses generally less than 10 per cent.

3. Concrete having a slump of 4 to 5 inches immediately after mixing is decreased in slump by a 90-minute haul in an agitator, about 1½ inches when the concrete temperature is about 60 degrees F. and 2½ inches when the concrete temperature is in the neighborhood of 80 degrees F.

4. A good relationship exists between loss in slump and a "degree-hours" factor for the concrete, "degree-hours" being the average temperature of the concrete multiplied by the length of haul in hours.

5. The amount of grinding is negligible for normal lengths of haul.

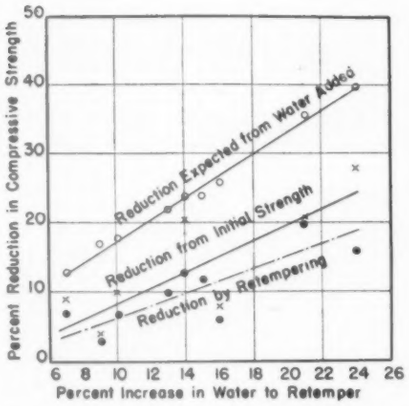

Figure 4—Reduction of strength by retempering.

6. Retempering concrete to restore lost slump appears to reduce the strength only about one-half as much as would be predicted from a normal water-ratio-strength relationship.

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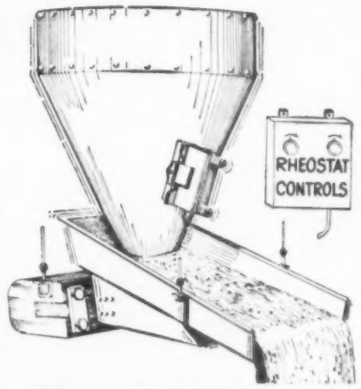
(*Continued on page* 137)

Table VI.—EFFECT OF RETEMPERING ON STRENGTH
Each value average of three tests from same sample.

Batch No.	Test No.	Time of Haul (Min.)	Slump (Inches)			Water Ratio		Strength (p. s. i.)		
			Initial	After Haul	After Retempering	Initial	After Retempering	Initial	After Haul	After Retempering
1	a	198	4.2	1.4	4.4	1.07	1.22	4,300	3,900	3,390
	b	262	.....	0.6	5.0	.....	1.30	.....	4,230	3,390
	c	327	.....	0.1	4.8	.....	1.33	.....	3,720	3,110
2	d	307	5.1	2.0	5.8	1.00	1.09	3,930	3,910	3,780
	e	375	.....	1.3	5.4	.....	1.15	.....	3,980	3,500
	f	436	.....	1.1	5.0	.....	1.16	.....	3,870	3,620
3	g	277	5.0	2.4	5.2	1.01	1.08	3,960	3,860	3,600
	h	341	.....	1.4	5.6	.....	1.11	.....	3,860	3,580
	i	405	.....	1.4	4.9	.....	1.14	.....	4,030	3,620

Table VII.—STUDY OF RETEMPERED CONCRETE
Rearrangement of data from Table 6.

Test No.	Percentage Increase in Water-Ratio to Temper	Percentage Reduction in Strength by Retempering	Percentage Reduction of Retempered Concrete from Initial (no-haul) Strength	Percentage Reduction in Strength $S = \frac{A}{B^x}$ $(B = 7)$
a	14	13	21	24
b	21	20	21	36
c	24	16	28	40
d	9	3	4	17
e	15	12	11	24
f	16	6	8	26
g	7	7	9	13
h	10	7	10	18
i	13	10	9	22
Avg.	14	10	13	24



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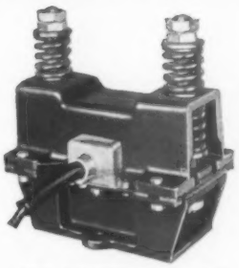

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Precast Steps Save Time and Expense for Both the Builder and Home Owner

Frank Kogl, inventor and Harold C. Olsen, licensee, in front of the latter's plant in St. Paul.

SEVERAL years ago Frank Kogl, a building contractor for over 20 years, decided to carry out an idea which would save many headaches for those engaged in this business. The construction of concrete steps had always been a problem because of the labor and expense involved in making the necessary forms. His idea was to precast these steps, and in 1939 he began his first experiments along this line. These were so successful that in 1940 he formed the Pre-Cast Step Form Company of St. Paul which holds the structural and method patents on this process. About sixty claims are involved and of these five are on the method. Mr. Kogl's experience in structural and ornamental iron work stood him in good stead in designing the necessary forms.

The first licensee under his patents was the Minnesota Pre-Cast Step Form Company of St. Paul. Partners in this project are Harold C. Olsen, a former brick mason; Edward J. Lange, head of Lange Brothers, cement contractors and concrete block manufacturers; and Herbert R. Law, a general contractor. A small plant was built near the Lange block plant.

In spite of the decrease in private building construction, over 500 precast concrete steps were sold during the company's first year of existence and this figure will be exceeded in 1943. Most sales are made through building contractors who are glad to avoid the construction of the steps. According to Mr. Olsen, who is in active charge of production and sales, many of the steps sold are used for rehabilitation and remodeling work. The steps, he says, sell themselves and when one is sold in a neighborhood orders for others soon follow. The installation of the steps is done by a contractor who gets a fixed fee for this work. They are delivered to the job by a special rubber-tired rig pulled by a truck.

Forms are provided for four general types of steps but Mr. Kogl also designs special forms to meet any specifications. Model A is the old-fashioned plain concrete step. Model B is a sectional house step. Model C is a platform on which Model B steps can be placed in any desired arrangement. Model D is a terrace step.

Terrace steps are made with one to five steps which can be combined for any desired height. Adjustable risers and treads on these forms make it possible to fit any angle of bank. Terrace steps are made 4 feet 9 inches wide with runners on both sides.

Model B, which is the most popular, is made with from 1 to 4 steps which can be placed in any desired combination. These steps are 5 feet wide and the forms are not adjustable. A 4-step unit weighs about 750 pounds and contains 12 pounds of reinforcing steel. Formerly more steel was used, but more efficient design has made it unnecessary to reinforce the sides of the steps.

These steps can be placed in a number of combinations. They can be placed side by side when wide steps are desired or opposite each other for a 2-way entrance. They can be used with or without railings and can also be used as a base for stone or brick trimmings on the tops or sides. Steps are poured inverted. The steel forms are first assembled. The inner shell is in one piece and the outer shell consists of two end pieces, and a separate piece for each step. Less than an hour is required to assemble a form, grease it, shape and place the reinforcing steel, and pour the concrete. The concrete is

Using chain hoist to lift out inner form.

Removing last step section of outer shell.

Terrace step curing in form. Note adjusting screws for pitch of steps.

Steps, in combinations of 4, 4 and 3, as installed in front of a house.

compacted by a Syntron electric vibrator attached to the form. It is then steam-cured for 3½ hours and under natural conditions for the remainder of 24 hours. The inner form is then removed by means of clamps and screws and the outer form taken apart, a process requiring only 10 minutes. This is done by means of a chain hoist which also handles the finished step. After additional curing for several days under damp burlap bags the step is ready for delivery. Washed sand and gravel and high-early-strength cement are used and a 1:1½:1½ mix results in a 4,500-p.s.i. concrete.

Time of Haul (from page 135)

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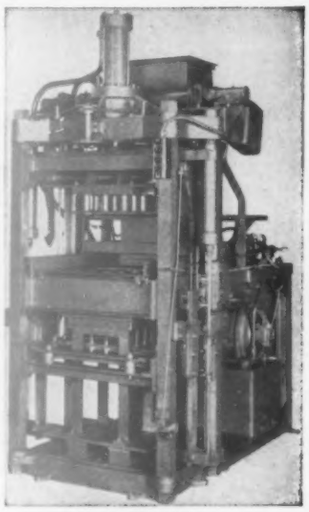

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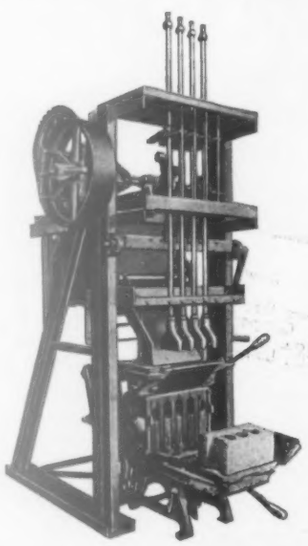

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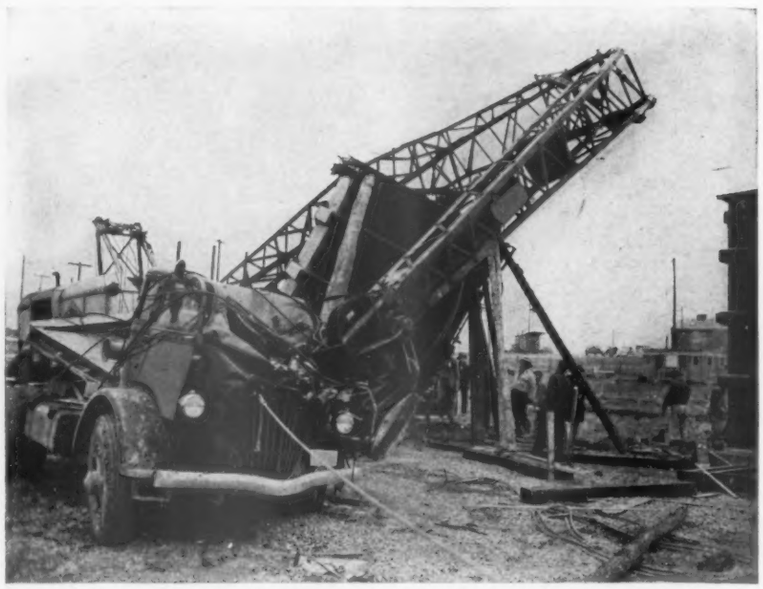

THE results of a hoisting accident are pictured above and the circumstances leading up to it, as reported in *The Travelers Standard,* were as follows:

The electric transformer shown tilted and braced under the crane boom, was being lifted off the truck in order to set it on a prepared foundation in line with the other transformer shown at the extreme right of the illustration. When the transformer had been raised a short distance, the crane boom buckled and the sheave end came down on the cab of the truck, crushed the top of it down almost to the seat level, and bent the steering wheel and column "into a knot." Fortunately, the truck driver had gotten down out of the cab before the accident occurred and, by so doing, probably escaped death or serious injury.

No one seemed to know the age of the crane or its rated capacity, but the owner had used it for heavy work before bringing it to the place where the accident occurred. Here, without any indication of weakness or undue strain, it had already been used to hoist and set in position a transformer of the same weight as the one that was being handled at the time of the accident, and also to hoist this second transformer from a railroad car and set it on the truck.

The cause of the boom failure was not determined conclusively. However, it is said that investigation disclosed several cracks or incomplete fractures in the braces of the boom, at the rivets. These had been painted over at some time and the paint had run down into the cracks. It was the general opinion that the boom swung to the right as it buckled, because at that moment the operator had started his swing to the left.

Several lessons may be learned from this accident. For example, the rated capacity of a crane should be ascertained and great care should be taken never to exceed it. Frequent and thorough inspections of all parts of the equipment are essential and the findings should be recorded so that they will be available for future reference.

Truck drivers should leave their cabs or seats whenever loads are being hoisted over or near them. In the present case, the driver realized that he had had a narrow escape. It was said that he was the happiest man on the job after the accident and he declared that thereafter he would always get out of his cab under similar conditions.

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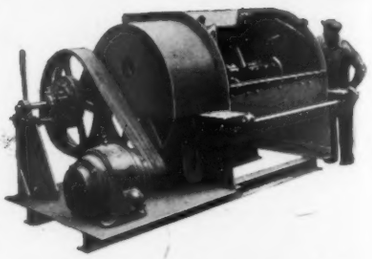


MULTI-MIXERS are supplied in either motor drive or geared-head drive eliminating pulleys and clutches. Reverse screw-type mixing action insures better concrete. All are SKF ballbearing equipped, with double seal ring packing bearings, etc., to eliminate the entrance of dirt. Abrasive-resisting steel or chromium plated liners available. Capacities from 5 to 60 cubic feet. Ask us for the names of well-satisfied MULTI-MIXER users. *Write Today for Complete Information!*

MULTIPLEX Equipment Available

We are in position to give reasonably prompt service on all orders. However, we regret that we are unable to supply new equipment unless a priority rating high enough to permit us to re-supply ourselves with the necessary steel accompanies your order. If you will supply us with your priority rating when ordering, it will aid us materially in determining our ability to serve you.

Multiplex Concrete Machinery Company
ELMORE OHIO

NAT-ALOY WIRE CLOTH

☒ VOTE **"YES"**

For this dependable, non-crystallizing, long-wearing Screen Cloth with "Nat-Aloy" Lock Crimp Meshes.

"IT'S THE PEOPLE'S CHOICE"

among profit-wise producers for precision separation and economical operation.

Stock shipments in all widths and all meshes. . . . Write for catalog No. 55.

NATIONAL WIRE CLOTH CO., INC.
252-270 W. FAIRFIELD AVE. — ST. PAUL, MINN.

SAVE TIME — SAVE LABOR

Neff & Fry super concrete stave bins for the storage of sand and gravel save labor. Also time. They are strong, portable, quickly erected anywhere. Thousands in service. New 1943 catalog ready.

NEFF & FRY STORAGE BINS
THE NEFF & FRY CO., CAMDEN, OHIO

GRUENDLER CRAFTSMANSHIP

Employed by U. S. A. in the WAR EFFORT

HEAVY DUTY CRUSHING and GRINDING EQUIPMENT for—Heavy Ores, Chemicals, Bauxite and ROCK Products

Gruendler Features:

MOVING TRACK BREAKER PLATES
For Wet, Sticky Materials.

TRAMP METAL CATCHER
Full Protection to Crusher.

Developed by Engineers who have made a Life Study of the Hammer Mill Principle for Material Reduction keeping in step with new features to meet the demands for greater efficiency and speed.

Write for our Bulletin on Large Capacity Hammermills

GRUENDLER CRUSHER & PULVERIZER CO.
PLANT and MAIN OFFICE — 2915-17 N. MARKET • ST. LOUIS, MO.

NEARLY NEW CONCRETE BATCHING PLANT

Capacity 250-350 Cu. Yd. Per Hour . . . Available for Immediate Delivery.

Complete Butler concrete plant. Excellent condition, used only 7 months. Adaptable for either commercial or construction use where high rate of concrete pour may be required. Equipped for manual, semi-automatic or automatic operational control. See details below.

BATCHING BIN. Bin—250 yd. capacity—190 yd. 3-compartment aggregate 400 bbl. cement.

2 BUTLER CEMENT STORAGE BINS. 2,000 bbl. capacity, 2-compartment, 3,000 bbl. capacity, single compartment. All bins equipped with air jets and steam jets.

BATCHERS. 1 Butler aggregate 5 yd. capacity, complete with beam-type scale, manual operation.

1 Butler cement 3,000 lb. capacity, complete with beam-type scale, manual or automatic operation.

1 Butler water batcher 200 gals. capacity, beam-type scale, complete with 400 gal. surge tank and valves, manual or automatic operation.

ELEVATOR & TRACK SCREW. 300 bbl. per hour capacity, screw 37 ft. long, equipped for either box car or hopper car cement delivery. Complete with 20 hp. electric motor.

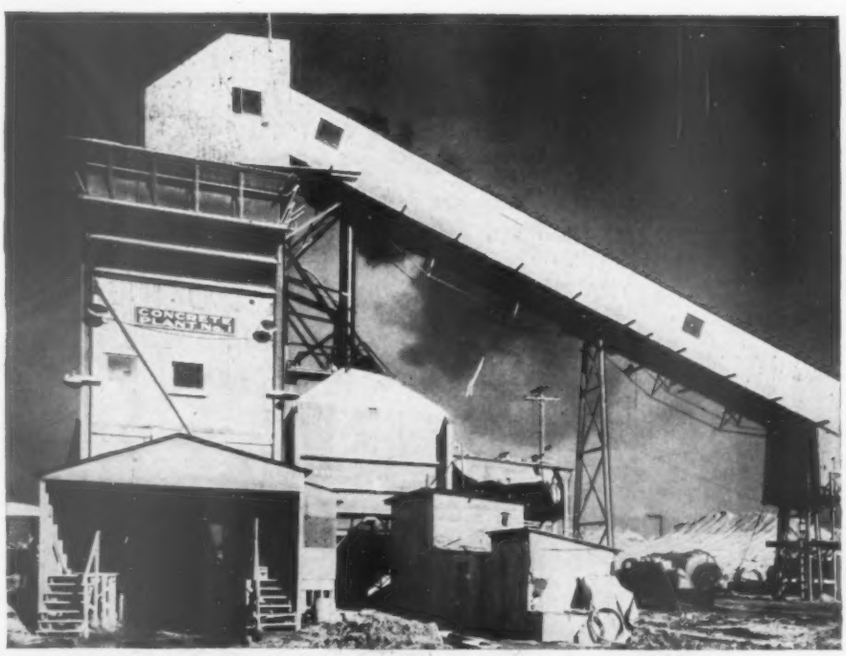
CONVEYORS. 1 Barber Greene 36" inclined conveyor 224'6" long, equipped with: 50 hp. Century motor; one 40 yd. track hopper; one 20 yd. track hopper; one 20 yd. truck hopper. All necessary A frames, trusses and supports included. All hoppers equipped with discharge gates.

1 Barber Greene 36" horizontal conveyor 129'6" long. Complete with 18 double clam-type fill valves, 20 hp. Century electric motor complete with trusses.

1 Barber Greene 36" inclined conveyc- 60'6" long. Complete with 15 hp. electric motor, trusses and supports.

All conveyors in excellent condition; two-way Alemite system of lubrication; band-type brake; pivoted distributor, ground level controlled. Conveyors operated under cover while in use. Idler take-up and return idler rollers in good shape. Extra length new 500 ft. belt available.

MISCELLANEOUS. Collecting hopper under batcher, 5 feet cement screw feeder complete with motor for automatic control of cement. Traveling hopper for charging batch trucks. Extra cement buckets, drive chain, elevator chain for cement elevator and track screw, etc.



Also 28 Late Model Transit Mixers

12—1942 Model Jaegers—High discharge, separate engine drive with two-speed transmission. 8 mounted on 1942 Dodge six wheelers, good rubber, excellent condition.

10—1942 Model Smiths—High discharge type. These mixers were used only 6 months.

Also 6 — 1938 Model Smiths — High discharge type. 3 mounted on 1938 Autocars, 2 on Macks and 1 on White truck. All single axle drive in good condition, with good rubber.

MOTOR TRUCK SALES AND EQUIPMENT COMPANY

Telephone: CALUMET 1255

2435 COTTAGE GROVE AVENUE **CHICAGO, ILLINOIS**

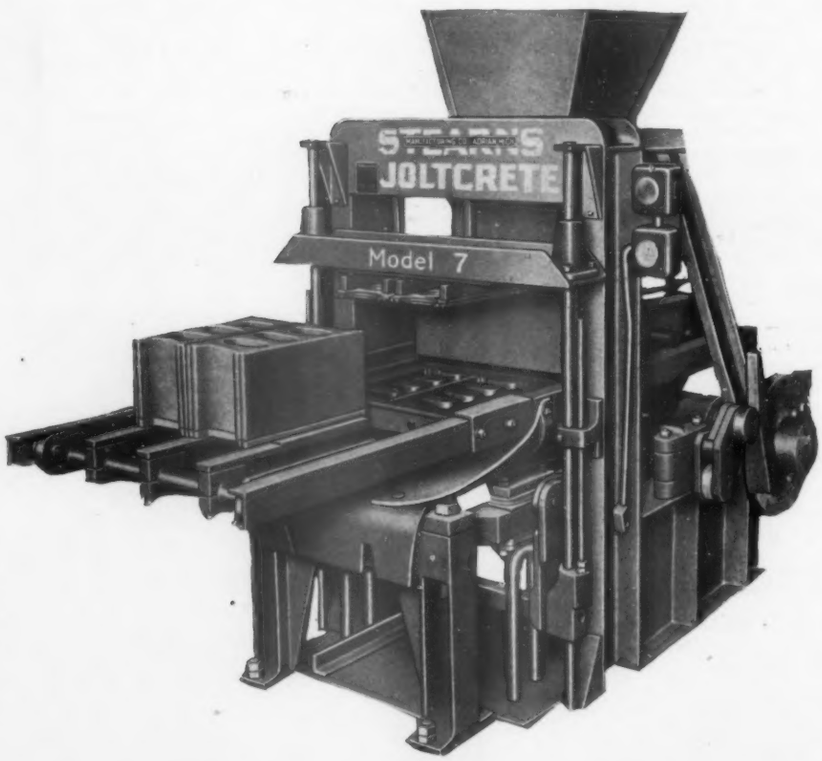
There's ALWAYS A REASON!

The engineering and production skill that won for STEARNS workers the first Army-Navy "E" and Treasury Bullseye flags awarded in their field are the same skills that make Stearns products plant machinery *preferred* equipment wherever quality concrete masonry units are made.

Although operating 24 hours a day, 7 days a week, producing war materials, we can still supply concrete products plant machinery for *necessary* construction work.

What is your pressing need?

Permit us to explain proper priority procedure.



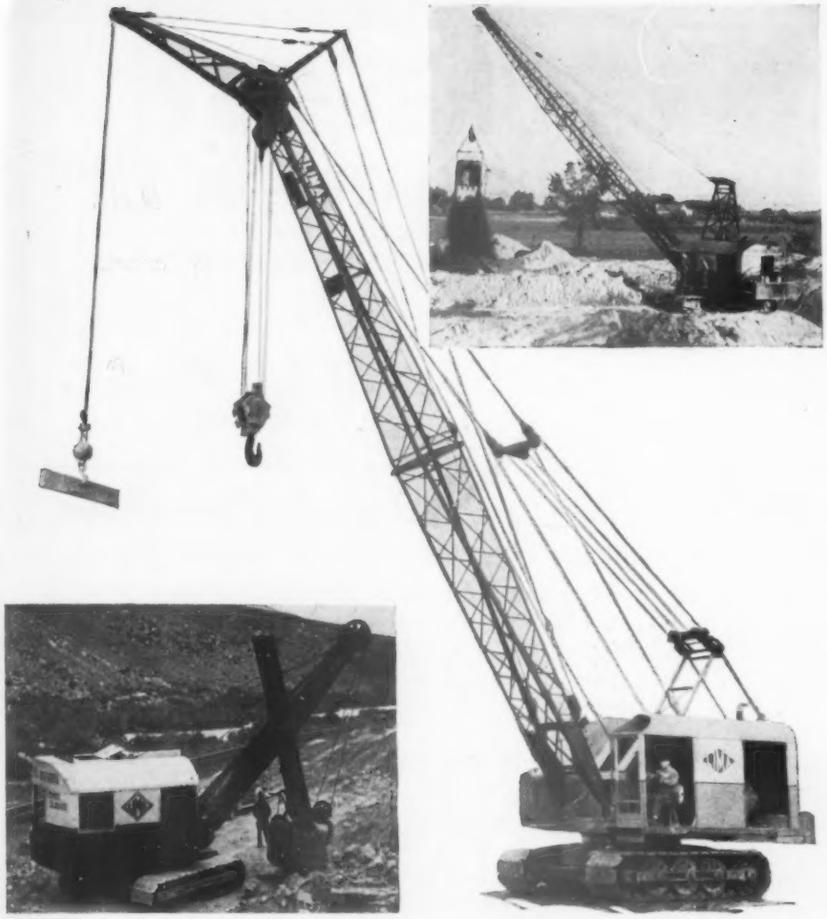
This is Stearns Model 7 Joltcrete (vibration type machine) that makes six dense, perfect 8x8x16-in. blocks per minute. Handles all types of aggregate with equal ease. Other models of larger capacity. *Write for folders.*

STEARNS

MANUFACTURING CO. - ADRIAN, MICH.

GENE OLSEN, PRESIDENT

Manufacturers of Stearns Joltcrete (Licensed under the basic Gelbman vibration patents) and Clipper Stripper (tamp type) block and brick machines . . . Mixers . . . Skip Loaders.



INCLUDE A LIMA IN YOUR FUTURE EXCAVATOR PLANS

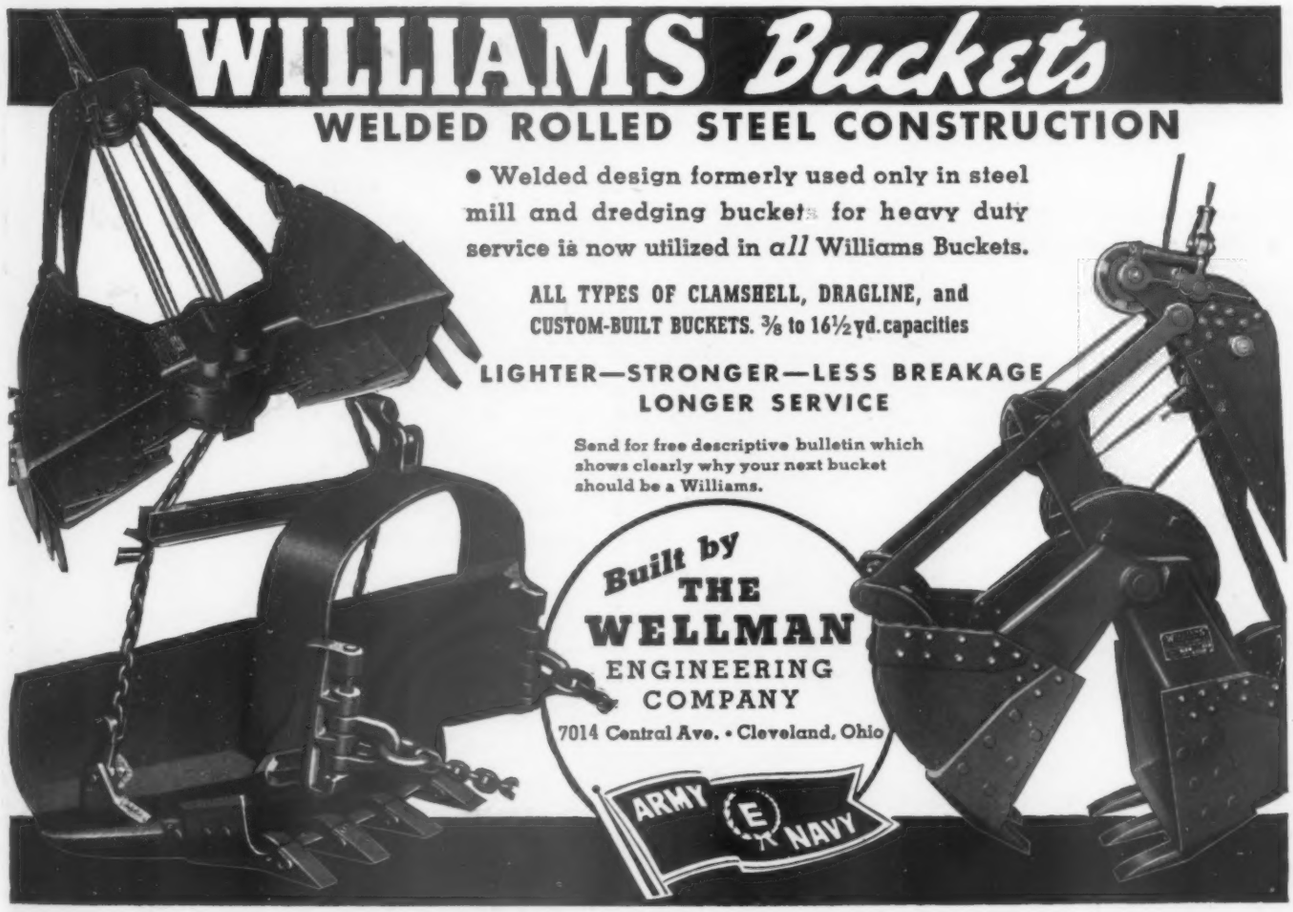
When you are thinking in terms of cranes, shovels and draglines it is smart to think of LIMA. LIMA Cranes, Shovels and Draglines are built in sizes ranging from ¾ cubic yards to 3½ cubic yards capacity. They are of compact design, perfectly balanced and easy to operate with a wide range of adaptability. LIMA Cranes, Shovels and Draglines provide reliable performance at low cost on any earth moving or material handling job. Include LIMA in your plans for the future.

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division
Lima, Ohio, U. S. A.

LIMA

WILLIAMS *Buckets*

WELDED ROLLED STEEL CONSTRUCTION



• Welded design formerly used only in steel mill and dredging buckets for heavy duty service is now utilized in *all* Williams Buckets.

ALL TYPES OF CLAMSHELL, DRAGLINE, and CUSTOM-BUILT BUCKETS. ⅜ to 16½ yd. capacities

LIGHTER—STRONGER—LESS BREAKAGE
LONGER SERVICE

Send for free descriptive bulletin which shows clearly why your next bucket should be a Williams.

Built by THE WELLMAN ENGINEERING COMPANY
7014 Central Ave. • Cleveland, Ohio

ARMY E NAVY

"WIRE SCREENS?

SURE BILL—BUY 'CLEVELAND'—WE DO!"

Tough, Durable, Accurate Wire Screens for Vibrators or Rotary Jackets

Cleveland is the "Buy" Word of Quality

THE CLEVELAND WIRE CLOTH & MFG. CO.

3574 E. 78TH STREET CLEVELAND, OHIO

for Making 1¼", ¾" or Agricultural Limestone...

THE WILLIAMS "SLUGGER" CRUSHER AND PULVERIZER

● Handles Large Stone or Screen Rejects ●

Rows of heavy, free swinging, fast revolving hammers, crush the material by impact until of proper size to pass through the grates. By reducing large rock to 1¼", ¾" or agricultural size in one operation, the "Slugger" has enabled operators to produce these sizes at a very low cost per ton and with small investment. Seven sizes—6 to 150 tons hourly capacity.

The Williams Patent Crusher and Pulverizer Co.
802 St. Louis Ave. St. Louis, Mo.

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OLDEST AND LARGEST BUILDERS OF HAMMERMILLS IN THE WORLD
PATENT CRUSHERS GRINDERS SHREDDERS

AIR SEPARATORS
ROLLER MILLS
CRUSHERS
GRINDERS
SHREDDERS

Uniform Separation

The new model GAYCO Centrifugal air separator makes possible the uniform and increased recovery of cement, lime and any other finely ground metallic or non-metallic material within a range of 80 to 400 mesh.

- Greater Capacity
- Cleaner Trailings
- 99% Through 325 Mesh
- 25% to 30% greater recovery of fines.
- Not affected by variation in speed or rate of feed.

Manufacturers also of "Reliance" Crushers, Screen, Elevators, Conveyors, Bin Gates, Grizzlies. Complete crushing, screening and washing plants for crushed stone, sand and gravel.

Universal Road Machinery Co.

RUBERT M. GAY DIVISION 117 Liberty St. New York, N. Y.
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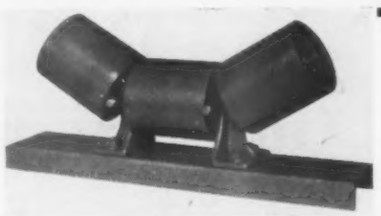
FACTORY & LABORATORY, KINGSTON, N. Y.

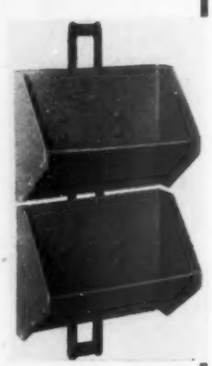


Columbus Belt Carriers and Idlers with anti-friction bearings

YOU *need* US!

The Columbus Conveyor Company—with a quarter century of experience—is prepared to engineer and build complete plants for sand and gravel, lime, gypsum, cement or crushed stone or other materials.

You can also obtain individual equipment or parts, and you are assured of efficient service on small orders for buckets or similar items.



Continuous Type Style "C" Steel Elevator Buckets

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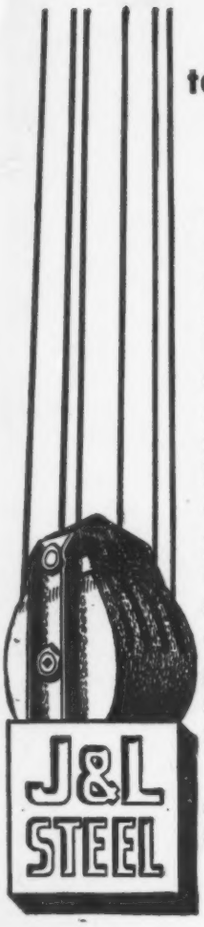
The COLUMBUS CONVEYOR CO., Columbus, Ohio

Some territory open for responsible representatives



It takes wire rope to lift "block-busters" into bomb-bays

And that's just one of the unnumbered uses of wire rope on the fighting fronts. As many and more on the home front, industrial front, shipping front. Every length of wire rope now in service must last longer than ever before. So take care . . . extra care . . . unceasing care of your wire rope. Use facilities and services of regular source of supply in helping care for your wire rope . . . get maximum ton-miles of service for seeing you through to victory.

JONES & LAUGHLIN STEEL CORPORATION
WIRE ROPE DIVISION
PITTSBURGH AND MUNCY, PA.

SIMPLICITY GYRATING

SCREENS are operating 24 hours daily in many of the 1000 aggregate plants using them today. To assist in keeping these units operating with a minimum of lost time, the Simplicity Engineering Company has arranged with the C. A. P. for *Courier Service,* so that urgently needed parts can be quickly flown to their destination. Another example of providing the fastest service available.

Simplicity Engineering Co.
DURAND . . . . . MICHIGAN

No time for absentee wire rope

In a mechanized war, fighting equipment *dares not* be absent; industrial equipment *should not.* Even though your wire rope is carrying many an extra burden, proper care will prolong its life. So . . . make sure that inexperienced operators understand its *correct* use. Gear up rope inspection. Avoid damaged sheaves and drums.

The prime way to get top rope performance is to *start* with the stamina of Preformed Yellow Strand. Install it on power shovels for hoist and swing lines, and as crowd and rack ropes . . . on dragline machines, too, for hoist and drag lines . . . and on clam shells for holding and closing lines. Preformed Yellow Strand is a quarryman's mainstay that *will stay* on the job.

Broderick & Bascom Rope Co., St. Louis
Branches: New York, Chicago, Houston, Portland, Seattle
Factories: St. Louis, Seattle, Peoria

YELLOW STRAND
PREFORMED
WIRE ROPE

B & B's Army-Navy "E" Flag, Three Times Won, Means that . . .

We Serve the Government as We Serve Industry: with Determination that Our Entire Energies and Resources Shall Help to Win the War

"Poosh 'em up" *FASTER*

with the OTTAWA *Jay Hawk* Hydraulic Front End Loader

For International Tractors, Models 1-4, 1-6 and 1D-6.

The MODERN Unit for moving sand, coal and other bulk materials

There's no *loafing* on the job when a "JAYHAWK" is *loading*. It speeds up handling bulk materials by its special features.

Look 'em over!—light but rugged construction, fast and easy operation, averaging two loads per minute. Complete finger tip control, low ceiling clearance, and a clear view of the job. The ½-yd., 48" bucket has a full lift of 8 feet, and automatically stops when in highest position.

Write for Information

OTTAWA STEEL PRODUCTS, INC.
Ottawa • Kansas

Thank You, Mr. Jeffers
For Relief in the Rubber Crisis

Thanks for a hard job, well done, as Rubber Director. The American Rubber Manufacturing Company joins its customers in expressing appreciation for this achievement:

—Many industrial rubber products formerly unobtainable, may now be had with little or no delay!

The AMERICAN RUBBER MANUFACTURING CO.
Factory and General Offices: Park Ave. & Watts St., Oakland 8, California

The LIGHTNING Ribbed Conveyor belt has yet to meet a moisture problem it could not handle!

Rebuild your TRACTOR GROUSERS WITH BULLDOG *Grip-Lugs*

Increases Traction Efficiency

A Quick and Economical Repair

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Send for Bulletin PQ-4

ALLIED STEEL PRODUCTS, Inc.
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McLANAHAN EQUIPMENT
for ROCK— SAND—GRAVEL

Single and double roll and jaw crushers, hammer mills, super dry pans, steel log washers and scrubbers, sand drags, revolving and vibrating screens, elevators, conveyors, dryers, jigs, hoists. Complete portable, semi-portable and stationary crushing, screening and washing plants for different capacities of any materials.

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ROUND
SQUARE
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HEXAGON
PERFORATED PLATE
of every description
for maximum productiveness from your vibrating screens.
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FOR EXTRA PROTECTION IN SHIPPING AND STORAGE

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PAVING THE WAY FOR EFFICIENT OPERATION!

● The asphalt mixing plant shown above uses a double deck 4 x 8-ft. Link-Belt vibrating screen (over the storage bins) which accurately sizes 30 tons of crushed stone and sand per hour.

Link-Belt vibrating screens, available in various types and sizes, are serving many varied industries, where a screening operation is essential. In screens, as in other types of sand and gravel equipment—Link-Belt is a name which assures you of maximum efficiency!

LINK-BELT COMPANY 9333
2045 W. Hunting Park Ave., Philadelphia 40
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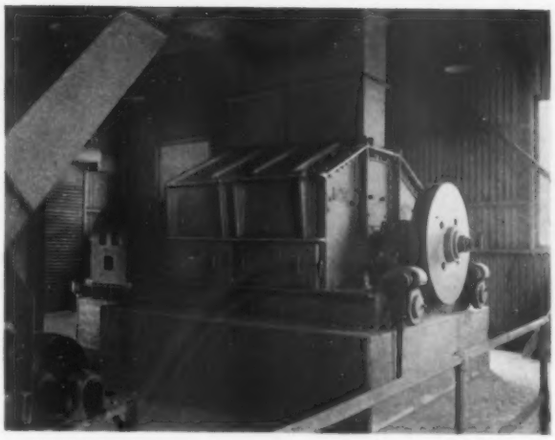
WRITE TODAY! **LINK-BELT Vibrating Screens**

"PENNSYLVANIA"



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For the efficient preparation of Cement making materials for grinding, a "Pennsylvania" *REVERSIBLE* Hammermill was selected by the Engineers in the course of their studies, which produced America's latest plant for the manufacture, under precision control, of the various types of modern Portland Cements.

Automatic Hammer Turning—Automatic Resharpening of Hammers and Cage Bars,—Reduced Discard due to Symmetrical Wear of Replaceable Parts, — Notably Reduced Overall Maintenance Cost, — and Lower Power Demand per ton,—were important factors leading to this selection.

"Pennsylvania" *REVERSIBLE* Hammermills for Cement, Lime and Gypsum Plant service, are available in 15 sizes, in a capacity range of from 10 to 600 tons hourly.

PUT YOUR REDUCTION PROBLEMS UP TO US.

PENNSYLVANIA CRUSHER COMPANY

LIBERTY TRUST BLDG., PHILADELPHIA 7, PA.

STEAM—GASOLINE—DIESEL LOCOMOTIVES—ELECTRIC OR MECHANICAL DRIVE

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Entrust Your Post-War Haulage to Modern Davenports

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DAVENPORT LOCOMOTIVE WORKS
A DIVISION OF DAVENPORT BESLER CORPORATION, DAVENPORT, IOWA

STEAM—GASOLINE—DIESEL LOCOMOTIVES—ELECTRIC OR MECHANICAL DRIVE

CONNECTING RODS are L-O-N-G-E-R in WISCONSIN HEAVY-DUTY AIR-COOLED ENGINES

The length of rods in Wisconsin Engines is 2½ times the length of the stroke. This extra length is an important factor in reducing vibration to a negligible minimum because *long rods reduce angularity* and this, in turn, reduces piston pressures against the cylinder walls. The shorter the rod, the greater the vibration and wear — so we don't use short rods in Wisconsin heavy-duty air-cooled engines. Another detail that contributes to Wisconsin dependability.

MOST POWER PER POUND

WISCONSIN MOTOR Corporation
MILWAUKEE, WISCONSIN, U. S. A.
World's Largest Builders of Heavy-Duty Air-Cooled Engines

MEET WARTIME EMERGENCIES

Write for Information

WITH WARTIME EFFICIENCY

Today a crushing unit is expected to operate longer hours and with less breakdowns than ever before. American Crushers are built to take punishment and give good results. No need to worry if you have an American Crusher on the job, it surpasses all requirements.

AMERICAN PULVERIZER CO.
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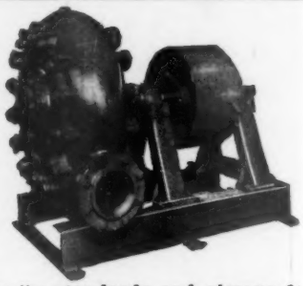
The **Lightning**

Sand and Gravel Pumps
HEAVY-DUTY
(Ball-Bearing)
and Low Head Types



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Replacement parts made to jig standards and always fit and always available.
For 30 years LIGHTNING pumps have faithfully performed the work they are intended for. We manufacture a type and size to fit the need. Simplicity of design and ease of handling have made these pumps one of the most popular. Write for catalog now.

Mfg. by
KANSAS CITY HAY PRESS CO., KANSAS CITY, MO.

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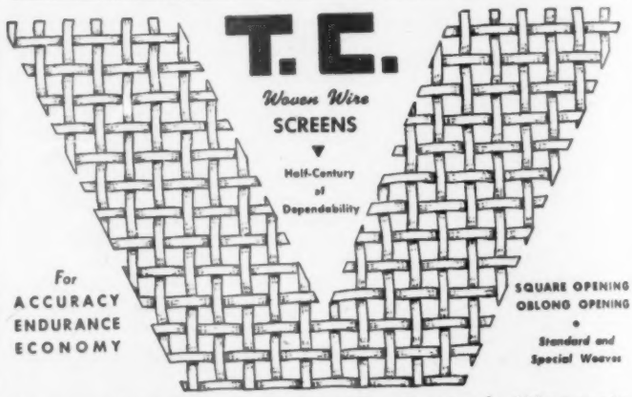
Woven Wire
SCREENS
Half-Century of Dependability



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SQUARE OPENING
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Standard and Special Weaves

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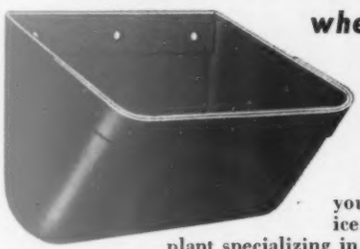
Think of STANDARD
when you need
ELEVATOR BUCKETS



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Tried, Proved and Guaranteed Vibrating Screens. Since 1919, the BEST in screening equipment at the LOWEST COST.

NEW! 32-page Catalog on Screens and Screening. Just ask for Catalog No. 107.

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"Everything for Blasting"

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POWDER COMPANY
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206 P. & H. Crane.
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Backhoe for 50-B.
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BELTED: 355, 528, 676, 1000, 1300 & 1570 Ft.
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50 Skips and Battleship Type, 2 to 6 Yds.
5 Owen & Bucyrus Rock Grabs.
CLAMSHELL: ½, ¾, 1, 1½ & 2 Yds.
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DRAGLINE: ½, ¾, 1, 1½ & 2 Yds. Cap.

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5 Ton BROWNHOIST, 30 Ft. Boom Gas.
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25 Ton BROWNING & 30 Ton AMERICAN Locomotive.
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2½ Yd. Lorain Model 95, Diesel Dragline.
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1½ Yd. Lima 750 Diesel.
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DUMP CARS
46—KOPPEL 1½ Yd., 24 & 30 In. Ga., V Shaped.
15—2 Yd., 3 Yd., 4 Yd. 36 In. Ga.
20—Std. Ga. 12 Yd., 16 Yd., 20 Yd. & 30 Yd. Cap.

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6x8 Continuous Pebble Mill.
5x5 Batch Mill.
5'x22" HARDINGE CONICAL Dry Ball Mill.
6'x22" HARDINGE CONICAL Pebble Mill.
4x8, 8x6, & 10x9 Straight Ball Mills.
8'x22" HARDINGE CONICAL Ball or Pebble Mill.
4x18, 5x18, 5x22, & 6x22 Tube Mills.
3½x8 & 5x7 Air Swept Tube Mills.
2x4½, 5x12 and 6x12 ROD MILLS.
4x16 Smidth Tube Mill Silex.
5½x20 Smidth Tube Mill Mang. Lining.
5½x18 F & M Tube Mill Silex.

PULVERIZERS
No. 1 Sturtevant Ring Roll.
RAYMOND Auto. Pulverizer No. 0000, 0 & 3.
RAYMOND Imp Mills No. 4, 32 & 55.
GRUENDLER 2XB Mill & Jay Bee No. 3 & 4.
RAYMOND 4 & 5 ROLL MILLS & 5 Ft. Chaser Mill.

SEPARATORS AND COLLECTORS
14 ft., 8 ft. and 12 ft. Separators

ROLL CRUSHERS
36x60 Fairmont Single Roll.
36x20 Diamond Double Roll.
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JAW CRUSHERS
10x8, 13x7¼, 14x7, 15x9, 15x10, 16x9, 16x12, 16x10, 18x11, 20x8, 20x6, 20x10, 20x12, 20x11, 26x12, 30x15, 30x13, 36x36, 36x18, 36x14, 36x15, 56x9, 36x6, 38x18, 36x10, 36x24, 42x9, 48x36, 60x42, 84x66, 36x16, 9x36.
30x10 Gruendler Roller Bearing.

CONE & GYRATORY CRUSHERS
18 in., 24 in., 30 in., 36 in. and 48 in. Symons Disc.
21K & 18N Allis Chalmers.
4—10 TZ Traylor 4 Ft. Gyratory.
4—Nos. 5, 3 & 6 Austin Gyratory.
3—Traylor T-12 Bulldog Gyratory.
8 in. Traylor 7, Gyratory, Telsmith No. 9.
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6, 10 & 13 Inch Superior McCullys.
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7 Ft., 5 Ft., 4 Ft., 3 Ft. and 2 Ft. Symons Cone.

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4—SANDERSONS 14 & LOOMIS 44.
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20T ARMSTRONG Well Drill.

HOISTING ENGINES
7 Gasoline 15, 40, 60 & 100 H.P.
17 Steam 7x10, 8½x10 and 10x12.
8 Electric 20, 25, 50, 60, 100 & 150 H.P.

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Nos. 4, 6 & 8 Williams Jumbo.
No. 36 Am. Ring Roll.
Gruendler No. 6X.

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100 Ton BLAW-KNOX 2 Compt.
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60 HP Fairbanks Morse.
140 HP Fairbanks Morse.
200 HP Atlas.

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5 Roll High Side.

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Cardholder for each switch.

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2—4 roll low side Mills, each with fan.

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1—12"x24" Farrel.
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1—9"x16" Reliance, fine reduction.

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1 yd. Link Belt K-30 Shovel.
1 yd. Northwest 105 Shovel-Crane.
10 ton Buf.-Spr. Roller, Gas, 3 Wh.
8 ton Buf.-Spr. Roller, Gas, 3 Wh.
24x13 Farrel-Bacon Crusher.
Sullivan F-211 D. D. Turbinair slusher hauler.
Elmco Tunnel Shovels, 12-B and 20.
5—Electric Hoists, 40, 50 and 60 HP.
McK.-T. Pile Hammers, 3, 5, 6, 7.
Barnes and La Bour self-pr. Pumps, 4".
Thor and Ing.-Rand Air Pumps.
Gard-D. Compressor, 630' A.A. Elec., Dr.
2—Ing.-Rand 110' Compressors.
22—Busters, Spades, Jackhammers, Sheeting Hammers.
1 yd. Round Shaft Buckets.
1 yd. and ½ yd. Dump Buckets.
Pullshovel and Skimmer Attach. for ½ yd. P. & H.
2—Shovel Attach. for Byers Bearcat, Jr.
Shovel Attachment for 41-B Bucy.-Erie.

•

J. T. WALSH
Brisbane Building Buffalo 3, N. Y.

FOR SALE IN BIRMINGHAM
Tunnel Equipment all on 36" Track Gauge
1—Cleveland Jumbo Mounting
2—Ingersoll-Rand DA-35 Drifters
1—20-A Conway Mucker, 30 H.P. D.C. Motor or Air Motor
14—Koppel Side Dump Cars, 70 Cu. Ft.
2—Jump over Switches, 40 lb. Rail Ramps and Two Drum Ingersoll-Rand Hoists, Scrapers, Pumps, Compressors, etc.
SALMON & COWIN, INC.
930 Second Avenue North Birmingham, Alabama

CRUSHERS
1—No. 1030 Roller Bearing Overhead Eccentric Type CHAMPION.
3—No. 6 CHAMPION, 12" x 26" Jaw.
1—No. 4½ CHAMPION, 10" x 20" Jaw.
2—No. 4 CHAMPION, 9" x 15" Jaw.
1—BUCHANAN, 12" x 20" Jaw.
1—RELIANCE, 8" x 14" Jaw.
1—4½" TRAYLOR Gyratory.
1—No. 2F TELSMITH Gyratory.

SHOVELS AND CRANES
1—1¼ Yard BYERS Master 5 Axel 60' Boom and 1 Yard Shovel Front.
1—1¼ Yard BROWNHOIST Crane 75' Boom.
1— ¾ Yard BROWNING Shovel and Crane Combination—40' Boom.

JOHNSON & HOEHLER, INC.
LANSDOWNE, DEL. CO., PENNA.

Wanted to BUY . . . for CASH

Industrial plants that are abandoned, obsolete, old or non-productive . . . plants of all types and sizes . . . located anywhere in the United States.

We solicit your inquiries . . . with inventories, if possible. Appraisals are made at our expense, without any obligation whatever.

Turn your non-productive properties into CASH. What have you to offer?

BROWN-STRAUSS CORPORATION
1402-1728 Guinotte Avenue, Kansas City 10, Missouri
LD-169 Box 78

LOCOMOTIVES SHOVELS — CRANES CARS

1—82 ton Porter 0-6-0 separate tender switcher, 22" x 26" cylinders, National Board and A.S.M.E. boiler, I.C.C. papers.
1—71 ton Baldwin 0-6-0 saddle tank switcher, A.S.M.E., Pennsylvania and Ohio code, built 1930, overhauled with entire new firebox.
1—40 ton American 4-wheel, saddle tank, standard gauge, A.S.M.E. boiler, completely rebuilt.
1—33 ton Vulcan 4-wheel saddle tank, standard gauge, A.S.M.E. boiler, new firebox in 1942, first class condition.

1—40 ft. steel underframe flat car, 50 ton.
1—60 ft. steel underframe flat car, 40 ton.

1—2 yard Hayward rehandling 2 line clamshell bucket, completely overhauled.

BIRMINGHAM RAIL & LOCOMOTIVE COMPANY
Birmingham 1, Alabama

FOR SALE
One No. 4 Schulthess Hydrator
One No. 4 Kuntz Hydrator
One No. 1½ Sturtevant Rotary Fine Crusher
One No. 2 Kuntz Raw Lime Feeder
One No. 2 Kuntz Feeder—Raw Lime or Stone
One No. 2½ yard Side Dump car—90% new
One No. 1 Sturtevant Rotary Fine Crusher
INQUIRE LIME & HYDRATE PLANTS CO. ASSOCIATES McGANN MANUFACTURING CO. YORK, PENNSYLVANIA

Mill, Plant & Mine Equipment

We will match your urgent needs.

A. Jay Hofman Company
Main Office: Narberth, Pa.

ROTARY DRYERS

1—6'-0" dia. x 30'-0" Dryer
1—4'-0" dia. x 21'-0" Dryer
1—3'-6" dia. x 25'-0" Dryer
1—3'-0" dia. x 20'-0" Dryer

We manufacture new dryers and have a stock of used dryers to offer. Send your inquiries to:

McDermott Bros. Company
Allentown, Penna.

FOR SALE
1—6'x12' HARDINGE ROD MILL with chrome steel liners and 20,000 lbs. new steel rods. Has Falk Herringbone steel cut gears direct connected to Falk speed reducer. No motor.
2—3'x5' double deck Type 38 HUM-MER VIBRATING SCREENS—no generator.
1—4 deck EXOLON MULTIFORM GRADER SCREEN for close sizing work.
2—No. 2 30"x6" JEFFREY VIBRATING FEED SPREADERS complete with Variacs for use on 110 Volt 60 cycle A.C. Current.

American Nepheline Corporation
361 Boxart Street
Rochester, New York

FOR SALE

2—Bonnot cast iron, 27" diam. Filter Presses, 40 and 80 chambers. Crushers, Hammer Mills, Grinders, etc. We buy your surplus equipment.

STEIN EQUIPMENT CO.
426 Broome St. New York City

OVERHAULED READY FOR WORK

P&H 600 Crawler gas combination shovel, crane and dragline, 1 yard.

Northwest crawler gas combination shovel, crane and dragline, ¾ yard.

Byers crawler gas crane and dragline, ¾ yard.

Our men have overhauled this equipment and it is in first class condition. Real low prices.

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THE ACME EQUIPMENT COMPANY
14057 Schaefer Highway
Detroit 27, Michigan

FOR SALE
ASPHALT PLANT
Barber-Greene Asphalt plant complete for Hot or Cold Mixes.
(1) 833 Barber-Greene Dryer complete with power, cold bucket elevator and plate feeder.
Mounted on pneumatic tires.
(1) 842 Barber-Greene pugmill with insulated tank, complete with Hot Bucket elevator, extra pugmill paddles, small tools and etc.
Mounted on pneumatic tires.
(2) 45 HP vertical steam boilers, complete with piping.
(1) 3 compartment 35 ton feeder bin with oscillating platefeeders, extra drives and chain complete.
Excellent condition.

Box 1112
PIT AND QUARRY PUBLICATIONS
538 South Clark Street Chicago 5, Illinois

DEPENDABLE EQUIPMENT FOR SALE AND FOR RENT

1—TRACTOR, Allis-Chalmers, Model L, equipped with front push bumper and electric starter. Price..**$3031.50**

1—TRACTOR, ANGLEDOZER AND SCRAPER, "Caterpillar" 50 Diesel, serial No. 1E1454, equipped with LaPlant-Choate Hydraulic Angledozer and LeTourneau 6 yd. Scraper and LeTourneau Power Control Unit. **$5647.00**

1—TRACTOR, "Caterpillar" D4, standard gauge, equipped with lights. .....**FOR RENT ONLY**

1—TRACTOR AND POWER CONTROL UNIT, Allis-Chalmers Model HD-14 Diesel and Garwood Double Drum Power Control Unit.....**$4975.00** Will sell tractor with or without power unit.

1—TRACTOR, International Model TD-40 Diesel **$1500.00**

1—CRANE, P & H, Model 206, equipped with 40' boom, powered by Waukesha Gasoline Engine. Price..**$2375.00**

1—SHOVEL, DRAGLINE AND CLAMSHELL COMBINATION, Osgood 1¼ yd., 45' boom, Waukesha Gasoline Engine, fairleads, 1 yd. Keisler Clamshell Bucket **$8600.00**

1—CRANE AND DRAGLINE COMBINATION, Link Belt Model K, 2 yd., 50' boom, fairleads, Waukesha Gasoline Engine. Excellent machine for steel erection. Price.....**$6750.00**

1—STEAM CRANE AND CLAMSHELL COMBINATION, Erie Model B2, Crawler Type, 50' boom, 40 HP Boiler, ⅝ yd. Owen Heavy Duty Digging Bucket **$2300.00**

1—GRADER, "Caterpillar" Model 66, Pull Type, 12' blade, hand controlled, leaning wheels **$400.00**

1—BULLDOZER, LaPlant-Choate, for new type Model D7 "Caterpillar" Tractor **$1225.00**

2—CRAWLER WAGONS, Euclid, 14 cu. yd. two way dump, hydraulic adapters for D8 Tractors, tracks nearly new. In good condition. .....**EACH $2500.00**

1—TRACTOR WINCH, Tulsa Model 70, single drum, 50,000 lb. line pull, drum 8"x22", adapted to Model D7 "Caterpillar" Tractor **$975.00**

1—AIR COMPRESSOR, stationary, Sullivan, angle compound, Model WJ-3, 348 cu. ft. actual air, equipped for flat belt drive.....**$1333.00**

1—AIR COMPRESSOR, Portable, Gardner-Denver 315 cu. ft., on 4 steel wheels, powered by "Caterpillar" Diesel Engine **$5206.00**

4—WAGON DRILLS, Cleveland Model DR8, mounted on pneumatic tires—Rebuilt .....**FOR RENT ONLY**

1—WAGON DRILL, Ingersoll-Rand, Model MDL, equipped with Model X71 Drifter, new in 1942....**$1180.00**

1—TRACTOR AND BULLDOZER, "Caterpillar" D4, wide gauge, equipped with LaPlant-Choate Hydraulic Bulldozer. .....FOR RENT ONLY

MOTOR GRADER, "Caterpillar" Diesel No. 12. FOR RENT ONLY

2—DUMPTORS, Koehring Model WD-60, 6 cu. yd., Diesel powered, pneumatic tires. .....FOR RENT ONLY

1—SHOVEL, Lorain Model 79, 1½ cu. yd. capacity, powered by "Caterpillar" Model D13000 Diesel Engine. FOR RENT ONLY

2—COMPRESSORS, Worthington 315 cu. ft. capacity, powered by "Caterpillar" Model D13000 Diesel Engine, mounted on 4 steel wheels. FOR RENT ONLY

1—TRACTOR AND DOZER, "Caterpillar" Model D8, with cable controlled 'Dozer. .....FOR RENT ONLY

1—SHOVEL, Koehring Model 604, 1½ cu. yd., powered by "Caterpillar" Model D13000 Engine. ..... FOR RENT ONLY

1—ROLLER, Galion, 10 ton, 3 wheel, with gasoline engine, scarifier and cab .....**FOR SALE OR RENT** Sale Price **$2395.00**

2—ROOTERS, Heavy Duty LeTourneau Model H3 .....**FOR RENT ONLY**

1—ROLL CRUSHER, H & B, 2 roll, 14x20, one plain and one flange roll. **$875.00**

1—PULVERIZER, Gruendler Model 2XA, used less than 3 months..**$850.00**

1—PULVERIZER, Gruendler Model 2XA, welded frame. Operating condition **$525.00**

1—CENTRIFUGAL PUMP, Rex 4", 4 cylinder radiator cooled gasoline engine, on two steel wheels....**$395.00**

1—CENTRIFUGAL PUMP, Jaeger 6P, 6 cylinder gasoline engine, 90,000 GPH, on 4 steel wheels.....**$1075.00**

2—CENTRIFUGAL PUMPS, Jaeger 4XP, 4 cylinder air cooled gasoline engine, 30,000 GPH, on 2 steel wheels **— FOR SALE OR RENT WITH OPTION** **$430.00**

1—C. H. & E. SAW TABLE, Combination rip and cut-off, all steel frame, equipped with 12" rip and 12" cut-off blades, gasoline powered..**$195.00**

1—TRUCK SCALE, Winslow 15 ton, all steel special contractors, platform 18x8, with all steel runways..**$595.00**

1—TRUCK SCALE, Winslow 15 ton, Model P, 9x18 platform.....**$315.00**

1—DITCHER, Barber Green, Model 44B, equipped to dig 12" to 18" wide and 5' to 6' deep.....**$2750.00**

1—LOCOMOTIVE TYPE BRUNNELL HORIZONTAL BOILER, 85 HP, mounted on 2 solid rubber tires, trailer arrangement. Excellent condition **$2500.00**

1—TRACTOR, "Caterpillar" 50 Diesel. **$2475.00**

1—SHOVEL, CRANE AND PULL SHOVEL COMBINATION, Insley Type R, Serial No. R-239, equipped with Buda Gasoline Engine, ½ yd. capacity shovel front, ½ yd. capacity pull shovel attachment, crane boom....**PRICE ON APPLICATION**

1—CRANE, SHOVEL COMBINATION, 1½ yd. Heavy Duty, Model 701 Koehring Serial No. C-2007, equipped with "Caterpillar" D13000 Diesel Engine and standard boom with extensions up to 120' approximate. Also equipped with nearly new shovel front attachment, and special third drum for pile driving, etc. .....**PRICE ON APPLICATION**

1—COMPRESSOR, Schramm Model 160, powered by gasoline engine 160' capacity, on 4 steel wheels. **FOR RENTAL ONLY OR RENTAL WITH OPTION TO PURCHASE**

800 WEST MAIN
Wabash 1375

ROY-C-WHAYNE SUPPLY COMPANY.

LOUISVILLE, KENTUCKY

For Sale: Dixie Mogul 50-40-swing hammer crusher, together with its electric motor, 125 horse, 440 volt Texrope drive. This whole outfit almost new. Located in Oklahoma.

Concho Sand & Gravel Company
Forty-Fourth and North Portland
Oklahoma City, Oklahoma

1—13-B Telsmith Gyratory Crusher.
1—10-B Telsmith Gyratory Crusher.
1—40-A Telsmith Gyratory Crusher.
1—36" Telsmith Gyrasphere Crusher.
1—5' x 12' Telsmith Triple Deck Pulsator Screen.
1—8" Centrifugal Pump direct connected to 40 H.P. Motor.
1—75 H.P. 2 Cylinder Fairbanks-Morse Oil Engine direct connected to 62KVA Generator.

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Blue Ball Machine Works
Blue Ball, Pennsylvania

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70 & 90 Cu. Yd. Gravel Bins
Thomas two drum Hoist, Class A, 50 H.P., (less motor),
Thomas two drum Hoist, Class Y 20, 30 H.P., (less motor),
Industrial Brownhoist Crane, 15-ton, crawler type, four cylinder Climax Gas Engine
Barber Greene Loader, model 42A, Disc Type,
Caterpillars (2) with bulldozer attachments, 60",
Cletrack 8-ton tractor with bulldozer attachments, 40",
Wisconsin Roll Crusher, 30" dia., 16" wide,

Clamshell Buckets

¾ and 1 yard Erie's, General Purpose;
¾ and 1 yard Owen's, type K;
⅞ and 1¼ yard Blawknox, rehandlers;
1 yard Brownhoist, rehandler;
2 yard Owen, Type S,

100-lb. Bradley Helve Hammer,
150-lb. Bradley Strap Hammer,
20" x 8' Q.C.G. Engine Lathe,
20" Upright drill press, No. 4 Morse Taper, and several other items for construction and industrial machinery.

All the above equipment is offered subject to prior disposition and is available immediately.

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Yates Machine Works
115 Main Street Rochester, Michigan

FOR SALE

1—10 Ton 3 wheel Buffalo Gasoline Roller 4 Cylinder with Scarifier, Serial 15680
1—10 Ton 3 wheel Buffalo Gasoline Roller 4 Cylinder with Scarifier, Serial 15570

The above rollers are in good condition.

THE HENRY H. MEYER COMPANY, INC.
110 South Howard Street Baltimore, Maryland

CRUSHERS FOR ROCK & ORE REDUCTION

Four, (4) practically new Compeb or Plypeb Mills complete with steel linings, Bendix drives and 400 HP motors & all attachments
Three (3) short, rotary Calcining Kills. Brick lining.
One 48" x 36" Slugger Mill. 90% new.
One No. 4 Williams, Jumbo type Hammer Mill.
One 26 inch & one 12 inch Traylor Bulldog crushers.
One 54" x 24" Allis-Chalmers crushing rolls. Also one 42" x 16" type B with new shells
One No. 10 & one No. 5 type K crushers, and one 7½ McCully.
One 20 inch, type "TY" Traylor reduction crusher with motor.
ELECTRIC HOISTS. One 400, one 200, and one 150 HP.

Further details and prices on application to
H. O. Conklin, 1660 W. 104th St., Chicago

FOR SALE: A GOOD TIME TO BUY

Crushers Gyr. 9K—9McC—8K—7½D—Rolls 54x24
Loco. Crane Ohio 25-ton RR steam 60-ft. boom
Draglines—Bucyrus Cl. 14 cat steam—Monig No. 3
Shovels (3) Marion 125 cat steam and electric
(3) Bucy. 50B cat steam
Crushers Jaw—36x24—30x36—24x36—25x42
Cranes 50-ton hammerhead—2 tramways—3 cableways

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RELAYING RAILS—Super-quality machine-reconditioned—not ordinary Relayers.
NEW RAILS, Angle and Splice Bars, Bolts, Nuts, Spikes, Frogs, Switches, Tie Plates, and all other Track Accessories.
Most sizes usually available from warehouse stocks. Every effort made to take care of emergency requirements. Phone, Write or Wire

L. B. FOSTER COMPANY, Inc.
PITTSBURGH NEW YORK CHICAGO

15 ton, 22' x 9' Bonded Motor Truck Scale $440.00
20 ton, 24' x 10' Bonded Motor Truck Scale $575.00
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3' x 6' Bonded Vibrating Screen—Single deck $495
3' x 8' Bonded Vibrating Screen—Two deck $685.00
Bonded Stoker Coal Crusher.....$345.00

All new—immediate delivery. Also some guaranteed used equipment without priority.

Bonded Scale Co., 110 Bellview, Columbus 7, Ohio
Scale, Vibrating Screen and Crusher Mfrs.

FOR SALE
SLACKLINE CABLEWAY

85' Steel Tower—150 H.P. Motor—2 yd. Bucket. Complete in every detail and in best of condition.

DEWATERING ELEVATOR

Link Belt—33⅓' Centers—200 tons per hr. Dumps on 36" picking belt 65' long—All Steel Framework—Completely Equipped.

Kickapoo Sand & Gravel Company
Box 112, Peru, Indiana

DEPENDABLE USED MACHINES

Haiss loader, Model 80, "Bank Special"
Browning ½ yard shovel
5 ton truck crane on 6 wheel truck
Plymouth 8 ton std. gauge locomotive
6 x 12 hammermill and bucket elevator
Conveyors 18 x 25; 18 x 40; 18 x 35; 24 x 40
All sizes gasoline power units.

TRACTOR & EQUIPMENT COMPANY
3506 West 51st Street Chicago, Illinois

FOR SALE

18" x 36" Stevenson Single Roll Crusher.
9" x 36" Wheeling Jaw Crusher.
9" x 15" Phillips Jaw Crusher.
#4 Champion Jaw Crusher.
#1 Williams Hammermill Crusher.

PITTSBURGH MACHINERY & EQUIPMENT CO.
Aspinwall Pennsylvania

FOR RENTAL OR SALE

2—1 yd. Shovel-Crane-Backhoe Combination
1—1¼ yd. Shovel-Crane-Backhoe Combination
4—3 axle 10 wheel Truck Cranes, pneumatics
5—2 axle Pneumatic Truck Cranes
2—Platform trailers
6—Bulldozers 20-92 H. P.

A. C. CONTRACTORS MACHINERY, INC.
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MOtt Haven 9-1570

FOR SALE: Lime Plant—Southern Indiana—five (5) vertical kilns with equipment; good condition. Fifty-five acres land; unlimited deposit High Calcium Colitic Stone; also stone suitable for manufacture of Rock Wool.

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2—Clark—3 ton Low Lift Trucks TL580, TL581, first class condition.

Prices on application subject to prior sale.

CONCRETE STONE AND BLOCK CO.
14647 West Warren
Dearborn, Michigan

No. 5 Austin Crusher

Excellent condition Manganese Concaves Steel Bottom Plate, Eccentric and Bevel Gearing, Corrugated Head. Will deliver in radius of 200 miles of Marion, Ohio.

J. M. Hamilton & Sons
Stone Quarry
Marion, Ohio

ELECTRICAL MACHINERY

Motors and Generators, A.C. and D.C. for sale at attractive prices. New and Rebuilt. All fully Guaranteed. Send us your inquiries.

V. M. NUSSBAUM & CO., Fort Wayne, Ind.

FOR SALE

Crawler type Steam Shovel and boom ¾ yd. Bucyrus-Erie — Type B serial No. 984
EXCELLENT CONDITION

Manley Sand Company
Rockton, Illinois

One 4 yard and one 5 yard Dragline Buckets, medium weights, both in good condition.

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FOR SALE

Fifty Brooks 2 yd. Loadlugger steel pans; virtually new condition; will deliver freight paid for considerably less than half of new price.

SAM SMITH, Machinery
P. O. Box 289
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25 TON LOCOMOTIVE CRANE

Browning No. S-C, steam, 50' boom, code boiler 125 lb. W.P., immediately available.
Also offer 2 yard **Owen Clamshell Bucket.**

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RAILS NEW AND RELAYING

MOST ALL SECTIONS IN STOCK also spikes, bolts, frogs, and switches available.
500 BRICK DRYER CARS
Always in the Market to buy surplus material. Send us your inventories.

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WANTED

GYRATORY CRUSHER—20 inch

BLUE ROCK, INCORPORATED
Box 110, Washington C. H., Ohio

WANTED

1—54" Diameter Vertical Boiler A. S. M. E. 150 lb. pressure.

THE HENRY H. MEYER COMPANY, INC.
110 South Howard Street Baltimore, Maryland

WANTED TO BUY: Stearns Joltcrete block machine in good condition, and 8"—10"—12" Cast Iron Pallets—50% air space.

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Give qualifications, including age, education, experience. Address:

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WASHINGTON, D. C.

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We look into the earth
PENNSYLVANIA DRILLING COMPANY
PITTSBURGH, PA.

WANTED TO BUY

Well Drill for Blast Holes 6" to 8" diameter.

1600 lb. String of Tools. Wire Line.

SUPERIOR STONE COMPANY
Raleigh, North Carolina

WANTED

42" or 48" x 10' or 12' Symons Double Deck Vibrating Screen.

One log washer with double logs, paddle type, 14' or 16' long. Please state price, condition, size, make, and where same may be inspected.

BATTLE CREEK GRAVEL CO.
Battle Creek Michigan

WANTED! To buy a good block machine with a daily capacity of from 900 to 1500 blocks per day; also a batch mixer and skip and hoist. Give full details and price.

F. W. COFFMAN
241 Paul Street Harrisonburg, Va.

WANTED experienced concrete pipe, concrete block or special products man to take full charge of product department of national organization having twenty-five plants. Applicant should be familiar with practical side of pipe, block or special products manufacture.

BOX 704
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WANTED

Shovels—¾ to 2½ yards.
Draglines—1½ to 6 yards.

FRANK SWABB EQUIPMENT CO.
HAZELTON, PA.
Telephone 3906

WANTED

½ yd. or larger Truck Crane and Clamshell Bucket.

HERBERTSON SAND & GRAVEL CO.
75 Raritan Street Denver 9, Colo.

WANTED

1—No. 3 Symons Crusher
1—8" or 10" Feed Gyratory Crusher

Suburban Construction Company
P. O. Box 511
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SHOVELS—CRANES

Moore Speedcrane 15 tons, gas, 65′ boom.
Lima Model 101 comb. Shovel-Crane. Excellent.
Lima Model 101 Crane, 70′ boom, 30′ jib.
P & H Model 600 Shovel, 1 yard capacity
Bucyrus Erie Model 50B, 2 yd. comb. Shovel-Crane
Bucyrus Erie 1 yard Steam Crane, excellent.
Bucyrus Erie Model 1030 Electric Tunnel Shovel
Osgood heavy duty gas Shovel, 1 yard
Marion Model 460 Electric Shovel, 1½ yard
Byers ½ revolving Crane, Shovel & Backhoe
Ind. Brownhoist 10 ton cap. Crane, gas, 40′ bm.
Brownhoist 5-7½ ton Gas Crane, 30′ boom

SPECIALS!!

Kennedy-Van Saun Revolving Screen 4′ x 18′.
2—Steel Stiff-leg Derricks, 10 tons, 100′ bm.
Allis-Chalmers cent. pump, electric, 3500 GPM. 50′
Worthington 8″ cent. bronze impeller, elec. Pump
Butler 16 cu. ft. Asphalt Pug Mill

BUCKETS—STONE SKIPS

2 yd. Hayward Clamshell, rehandling
1½ yd. Williams Clamshell, rehandling
⅜ yd. Blaw-Knox Clamshell, digging
Hayward ¾ yd. Standard Orange Peel
⅝ yd. Williams Clamshell, digging
2—½ yard Haiss Clamshell, rehandling
¾ yd. Haiss Clamshell, rehandling
Erie ¾ yd. Clamshell, rehandling
Owen Stone Grapple

TRACTORS—BULLDOZERS

TD 40 Diesel Tractor with bulldozer
Allis Chalmers Model LO Tractor with bulldozer
Allis Chalmers K Tractor with Baker bulldozer
Allis Chalmers L Tractor with Baker bulldozer

CRUSHERS—CRUSHER PLANTS

Gyratory Crushers: K.V.S. 30, 37-S, 49; Traylor 8″; McCully 13″, 8″, 6″
Jaw: 10x22, 10x24, 11x18, 12x24″, 14x24″, 16x32, 56x84″
Complete Rock Crushing Sand & Gravel Plants

LOCOMOTIVES—CARS

American 60 ton, steam, std. ga.
American 50 ton, steam, Saddle Tank
American 45 ton, Saddle Tank
Porter 13 ton, Steam Saddle Tank, 36″ gauge
Vulcan 8 ton, std. gauge, gas
Vulcan 6 ton, 36″ gauge, gas
Whitcomb 4½ ton, 36″ gauge, gas.
20—Phoenix 5 yd. heavy duty, 36″ ga. Quarry Dump Cars
21—Koppel 4 yd., 36″ gauge Dump Cars
3—30 ton Standard Gauge Flat Cars, rebuilt

CONCRETE PLANT & EQUIPMENT

Heltzel 85 ton, 3 compt. Steel Bin, weigh batcher
Rex 28S Mixer on skids, almost new
Bulk Cement Bin, 350 bbls. Complete
Blaw-Knox 100 ton, 3 compt. Aggregate Bin
Heltzel 100 ton, 3 compt. Aggregate Bin.

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30 Church St. New York, N. Y.

We Own and Offer

NEW & USED EQUIPMENT

SPECIAL

1—**ROTARY CONVERTER** — Westinghouse, 1000 KW, Serial No. 1930945, 250 volts D.C., complete with panelboard.
1—**TRANSFORMER** — Westinghouse, 1100 K.V.A., Serial No. 463866, 3 Phases.
1—**TURBINE** — Westinghouse, 100 H.P. 2700 RPM, direct connected to Westinghouse reducing gear, ratio 3 to 1.

AIR COMPRESSOR

Ingersol-Rand. Type XB. Capacity 582 cubic feet with 100 HP Motor and receiver tank.

AGITATORS

23—For 12′ x 12′ Tanks.

DERRICK & CRANE

1—**DERRICK**—Steel Guy Derrick, 110 ft. Mast, 90 ft. Boom, equipped with Clyde three-drum hoist, General Electric 84 HP, 230 Volt D.C. totally enclosed motor.
1—**JIB CRANE**—Brownhoist, No. 5991, 45′ arm, capacity 4500 lbs.

DRYER—ROTARY

1—3½ x 44 ft.

FEEDERS

2—**BAILEY FEEDERS**, Type No. 2, complete with steel hoppers, 8½ dia. x 12 ft. cone bottom, 12″ screw conveyor, enclosed, 30′ long bucket elevator, 36 x 12 x 25, steel housing.
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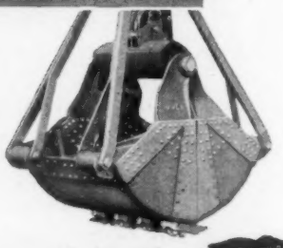

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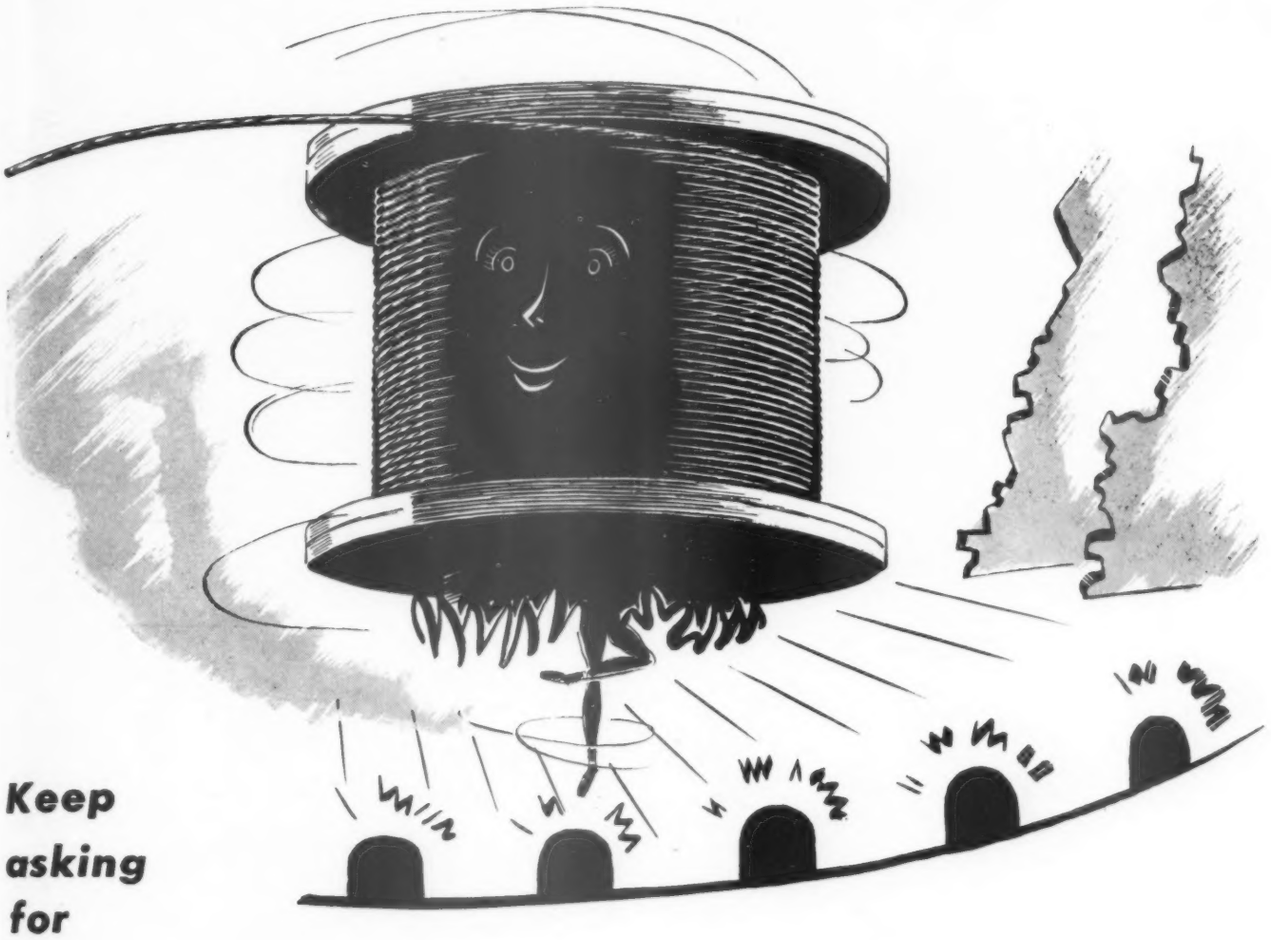

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